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PART I.—ESSAYS, MONOGRAPHS, AND CASES.

Amputation at the shoulder joint for the removal of a large Osteo-fibro-cancerous Tumor of the Humerus,—recovery of the patient. By J. M. CARNOCHAN, M. D., Surgeon-in-chief to the State Hospital, Professor of Surgery in the New York Medical College, &c.

A CASE of fibro-cartilaginous tumor, involving a part of the humerus, and weighing eleven pounds, in which amputation at the shoulder joint was successfully performed by Sir Astley Cooper, is recorded in the Medico-chirurgical Transactions of London. Another similar case, in which the tumor removed weighed twelve pounds, is reported by Mr. Syme, of Edinburgh. In the following case, amputation at the shoulder joint was successfully performed for the removal of an osteo-fibrous tumor, involving the entire humerus, and weighing eighteen pounds and a half; being, I believe, the largest tumor of the humerus, thus treated, of which there is any mention.

Case. Francis Murphy, aged 30, a native of Ireland, married, stone-cutter by trade, of swarthy complexion, dark hair, and blue eyes, was admitted into the State Emigrants' Hospital, 18th March, 1854; had an enormous tumor involving the left humerus; stated that he was the youngest of twenty-one children, who were generally healthy, and that his mother and father were always in good health, the latter of whom, however, died at the age of 55, of some tumor about the jaw. About nine years ago, Murphy contracted syphilis, for which he was salivated.

In June, 1851, while on his voyage to the United States, he received a blow on the outer aspect of the arm, about its middle, with a marling spike. He paid little attention to this at the time; but in the course of a week a small tumor, as large as a pea, was observed to spring up at the seat of the injury. About six weeks after landing, he sought advice at one of the medical institutions of the city, and was ordered to use some stimulating liniment. But notwithstanding the use of various external applications, amongst which was the iod. pot. conjoined also with its internal administration, the tumor continued to grow, and at the expiration of twelve months had attained the size of two fists placed together. It was then observed to be globular in shape, extending mostly towards the external aspect of the arm. The pain was excessively severe and continuous, so as in a great measure to prevent sleep, although narcotics were freely used. During the succeeding twelve months, the morbid mass grew more rapidly, the pain at times becoming intolerable, and causing privation of sleep. All this time, he was totally unable to attend to his vocation, and he wandered about from one institution to another, seeking vainly for relief.

In June, 1853, two years from the commencement of the malady, the tumor had reached the size of a large adult head, and apparently involved the two upper thirds of the humerus. At this time Murphy presented himself for my opinion, and an operation for the removal of the entire mass was recommended. Dreading to submit to so severe an ordeal, and influenced by the representation of some ignorant charlatan, he submitted to the application of some caustic material upon different parts of the tumor. These applications produced ulcerations upon the surface of the posterior aspect of the tumor, and by the discharge thus resulting additional annoyance and irritation were induced.

Becoming tired of treatment which effected no good result, and the tumor still continuing to increase, accompanied by uninterrupted pain and distress, Murphy again, in February, 1854, sought my advice, which he had now made up his mind to follow.

At this phase of the disease, the patient was in a truly deplorable condition. In consequence of the continued discharge from the ulcerated portions of the tumor, and of repeated and profuse hæmorrhage from some of the enlarged veins, the coats of which had been destroyed by the extension of the ulcerative process, he was emaciated to an extreme degree, and presented the general characteristics of constitutional cachexia. The tumor had also become formidably large, involving the whole extent of the humerus, measuring in its largest circumference twenty-nine inches, and weighing eighteen pounds and a half, as was ascertained after its removal.

The general appearance of the tumor was ovoid, extending, as it were, centrifugally from the humerus, as the centre, almost equally on its differ-

ent aspects, encroaching above, on the humero-scapular articulation, and below, on the articulation of the elbow. There was no perceptible motion of the humerus upon the glenoid cavity, while below, at the humero-cubital articulation, there was partial motion. The surface of the tumor presented numerous veins enormously enlarged, ramifying in various directions, and imparting a bluish character to the color of the integuments. When grasped, the morbid mass felt solid, hard, and inelastic at some parts, while at others a sensation of elasticity was conveyed to the fingers. Generally, it was smooth and nodulated; and at two points, two ovoid elevations, as large as goose-eggs, projected from the general mass. Vide plate No. 1.

Operation. The patient, seeing before him the evidences of impending dissolution, now eagerly sought the alternative of the removal of his disease.

As it was not certain that disarticulation at the humero-scapular articulation would remove all the disease, I was prepared to remove, if necessary, such portions of the clavicle and scapula as might have been involved.

Another important point presented itself, in regard to the quantity of blood that was likely to be lost by operating after the usual manner of amputation at the shoulder joint. The tumor was enormously large; the vessels were much dilated; the axillary artery was imbedded in the dense and unyielding tissue of the tumor, and could not have been easily and promptly tied, or with certainty compressed at any stage of the incisions; and the patient was exceedingly feeble, and unable to bear the loss of blood. Unwilling to trust to compression, by an assistant, of the subclavian artery, where it passes over the first rib, I came to the conclusion to place a temporary ligature on the trunk of the subclavian, at the outer side of the scaleni. By this proceeding, the control of the hæmorrhage was rendered more certain.

On the 24th of March, the patient was brought into the operating theatre, and placed on the table. The assistants having taken their proper positions, and the instruments being arranged and placed so as to be within reach, chloroform was carefully administered. The veins of the neck became very much distended as soon as anæsthesia was induced, as is generally the case. This condition, together with the impossibility of throwing the shoulder downwards, on account of the size of the tumor, seemed to present serious obstacles, and to render it difficult to reach the subclavian; but by making a free incision immediately above the clavicle, parallel to its posterior border, commencing an inch outside the sternal end of this bone, and extending near to the insertion of the trapezius, and by taking the

precaution to use the American aneurism needle, the artery, at the depth of four inches from the surface, was secured without much trouble. As soon as the ligature was placed, a small cylinder of rolled muslin, of the diameter of the finger, was placed over the artery, and the ligature tied over this in a double bow knot, so as to be easily loosened and removed. My friend, Dr. Power, was entrusted with the care of this species of temporary tourniquet.

The patient was now drawn close to the edge of the operating table, so as to give freedom in making the necessary incisions for the removal of the arm. I had selected Larrey's method of amputation; for, if it be not always the best in ordinary amputations at the shoulder joint, it is by far the most proper mode of proceeding when this operation is required in cases of large tumors of the humerus, encroaching upon the shoulder.

With Langenbeck's short amputating knife, I made an incision, beginning a little above the acromion process, and extending for about five inches downwards, so as to separate the *deltoid* into two equal portions, and to pass a short distance below the level of the neck of the humerus. The arm was now drawn from the trunk. Placing the edge of the knife upon the anterior margin of the axilla, nearly on a level with the insertion of the *pectoralis major and latissimus dorsi*, a semilunar incision, with convexity downwards, was rapidly made across the anterior semi-circumference of the tumor, in a direction to strike upon the vertical incision. A corresponding semilunar incision was made across the posterior semi-circumference of the tumor, by directing the knife from the posterior margin of the axilla, beginning at a point opposite the commencement of the previous incision, and terminating so as to join it on the vertical incision. While these two semilunar incisions, which nearly embraced the entire circumference of the tumor, were being made, and that with rapidity, the hæmorrhage from the enlarged veins was appalling, the blood flowing, *en nappe*, in a torrent upon the floor. No time was to be lost; the flaps resulting from the incisions were quickly dissected back, and so maintained by an assistant, so as to expose the joint. Another assistant forcibly drew the arm downwards and forwards; the knife was made to enter the articulation from above, and to pass inside and behind it; and the operation was finished by carrying the instrument onwards, and dividing, from within outwards, the remaining soft tissues on a level with the inferior ends of the anterior and posterior semilunar incisions. Owing to the temporary ligature around the subclavian, the arterial hæmorrhage was trifling; the axillary, the two circumflex, and a few smaller arteries were promptly secured, and the patient re-animated by the applications of stimuli to the nostrils and by frictions upon the surface. The ligature under the subclavian was then loosened, but not removed.

A large number of pupils and medical gentlemen were present at the operation. The amputation was performed in thirty seconds, and was com-

menced as soon as the ligature was placed around the subclavian artery. I had the efficient counsel of my colleagues, Drs. Henry G. Cox and Ford; and I was ably assisted by my friends, Drs. Power, Gilligan, Brundige, and Abrams, and by the resident assistant Surgical Staff of the Hospital, Drs. Winer, Gould, Strowbridge Smith, Hagan, and Robinson.

Progress of cure. The following abstract is taken from the record kept by Dr. Winer, the senior House Surgeon:

The wound having been dressed so as to favor union by first intention, the patient was removed carefully to his ward, and placed in bed. At the evening visit the pulse was 84, and the patient inclined to sleep. At 9 o'clock he slept, and continued to sleep, with slight intervals, through the night, his pulse and respiration gradually increasing till 5 o'clock A. M., when the pulse was 128 and respiration 30, and short, slight subsultus. At 9 o'clock A. M. of the 25th, his tongue was dry in the centre, *Risus Sardonicus*, countenance anxious, and muscles of his nose expanding and retracting during respiration. Ordered beef tea and brandy. At 9 o'clock P. M., pulse 130, breathing easier. Ordered gtts. xx. M'Munn's Elixir of Opium, and brandy at intervals.

9, A. M., 26th. Pulse 120, respiration fair, tongue moist, and has slept well during the night. Stimulants decreased, and ordered chicken broth. At 6, P. M., the wounds were dressed for the first time since the operation. There is attempt at union by first intention throughout the stump. Ligature around the subclavian removed. An anodyne at night.

27th, 8, A. M. Has passed the night well, and every thing promising. Pulse 106, and respiration full, tongue clean and moist, urine redder than natural. At 5 o'clock, P. M., the wounds are dressed, all looking well. An anodyne at night.

28th, 9, A. M. Pulse 112, regular and full—had a good night's rest. There is a slight discharge of laudable pus. Bowels have moved during the night. At 6, P. M., wounds dressed, all healthy. An anodyne at night.

29th, 10, A. M. Pulse 106—has passed the night well. Countenance anxious and patient irritable. An anodyne at night.

30th, 9, A. M. Pulse 102—passed the night well, skin moist. Discharge from the stump is increased. Appetite good. At 1, P. M., pulse 100, inclined to sleep, perspires profusely. At 5, P. M., the patient being engaged in an animated conversation with a visitor (against orders), hæmorrhage occurred from the stump very profusely. The patient bled a minute and a half before the arrival of the House Surgeon, during which time sufficient blood had flowed to saturate the dressings and the bedding, and

occasion fearful syncope. The wound was immediately opened, adhesions had taken place, and the artery, from which the hæmorrhage came, deeply seated. Pressure with the fingers controlled further hæmorrhage. Carb. ammo. and brandy were given, and the patient rallied with difficulty. Firm and constant pressure for three quarters of an hour completely arrested the hæmorrhage. The wound was left open about two hours, when it was closed and pressure by compress and bandage applied. At 9, P. M., pulse 140, respiration hurried, and tongue dry. Ordered beef tea and brandy. At 10, an anodyne.

31st, 6, A. M. Pulse 120—has passed the night tolerably, sleeping at intervals. At 8, A. M., wounds dressed; union by second intention commencing in the stump, pulse 110. Stimulants decreased, chicken broth ordered. He is visited by his wife, which increases his pulse and alarms him. An anodyne at night.

April 1st, 7 o'clock, A. M. Pulse 106; has not rested well during the night, tongue coated but moist, surface warm, passes urine freely of a light color, depositing, upon standing, urate of ammonia. At 6, P. M., the wounds were dressed, discharge of pus rather free. Pulse 104, complains of pain, referred to his left hand and to the back. His position is changed, and a clean sheet passed under him. At 10, he takes an anodyne.

2d, 6, A. M. Pulse 90, irregular, passed a good night, slight subsultus, a whiff on expiration. At 6, P. M., pulse 105, tongue slightly dry at tip, and the patient feels alarmed for his own safety. Wounds dressed, very great discharge of pus from the stump, mixed with blood, pain in the back severe and prostration increasing, slipping down in the bed, desponding. Ordered quinine and iron, brandy and egg, and anodyne at night.

3d, 6, A. M. Slept well during the night, slight subsultus, and whiff still continues during sleep, pulse 100. At 8, P. M., still complains of very great pain in his back, wounds were dressed, discharge of pus not so great as yesterday nor as healthy. Small sloughs detached from superior part of the wound. Granulation about the glenoid cavity commencing. Wound above clavicle healthy. Patient's condition much improved, the only untoward symptom being constant inclination to go to stool, which is, however, relieved by suppository of opium and an anodyne.

4th, 8, A. M. Pulse 100; the patient has slept well at intervals. Discharge from wound is less, and rather thin and light colored, urate of ammonia plentifully deposited in urine. At 6, P. M., pulse 106, bowels moved during the day, great pain in his right hip. Wound dressed and looks healthy, except around the glenoid cavity, slight inclination to slough. Balsam Peru freely applied over the dressing. An anodyne at night.

5th, 6, A. M. Pulse 94, general condition improved, bowels moved

during the night. At 5, P. M., pulse 100, wound dressed. The glenoid cavity is partially exposed, and pus seems to collect around it. The discharge is greater than last night, the upper and lower part of the wound look healthy. An anodyne at night.

6th, 8, A. M. Pulse 100, condition favorable. 9, P. M., wounds are dressed, looking improved, two ligatures come away from the superior part of the stump. An anodyne at night.

7th, 9, A. M. Pulse 110, did not sleep well last night, perspires very freely, discharge of pus greater than yesterday, countenance anxious. At 6, P. M., the wounds are dressed, granulations commence about the glenoid cavity, discharge of pus still thin, the stump more painful than usual in dressing; an anodyne at night.

8th, 6, A. M. Pulse 86, rested well during the night. At 5, P. M., the stump is dressed, looking healthy, granulations being of a brighter color. Four ligatures came away.

9th, 8, A. M. Pulse 100, slept well, appetite voracious. At 6, P. M., wounds dressed and four ligatures come away; granulations around the glenoid cavity increase; balsam Peru still applied.

11th, 5, A. M. Pulse 88, slept soundly. At 5, P. M., wounds dressed, not looking so healthy; the parts around the glenoid cavity inclined to slough; an anodyne at night.

13th, 8, A. M. Pulse 98, irregular; tongue dry; twitching of the lips and picking at the bed-clothes, patient very irritable; discharge from the wound very unhealthy; bowels moved by injection.

14th, 8, A. M. Pulse 104, slept well without anodyne. At 7, P. M., wounds dressed; the granulations in the lower flap of the stump are large and light colored.

16th, 8, A. M. Pulse 88, had a good night's rest; bowels moved three times during the night, healthy. At 6, P. M., pulse 98, wounds dressed; granulations more healthy and discharge lessened.

18th, 8, A. M. Condition the same as yesterday. At 6, P. M., wounds dressed, appear healthy, but pus collects in the posterior flap, and that part is very painful.

19th, 8, A. M. Pulse 88, complains of a good deal of pain in the stump. At 6, P. M., wounds dressed, and the general condition very good. A counter opening is made in the posterior flap, from which an ounc eand a half of healthy pus is discharged; ligature of the axillary artery came away.

23d, 8, A. M. Pulse 90, complains of pain in the stump, appetite good, tongue clean. He was able to sit up in bed three hours this day. At 6, P. M., wounds were dressed—the incision made to secure the subclavian artery nearly healed—granulations around the glenoid cavity doing well;

the lower part of the anterior flap the skin is red, tumid, and painful. An artificial opening is made over it, and two ounces of dark-colored pus discharged.

26th, 8, A. M. The patient is up, and walking about the ward.

27th, 8, A. M. Pulse 94; eats, drinks, and sleeps well. At 6, P. M., the wound dressed, the glenoid cavity granulating well; only a very slight discharge from the inferior opening.

30th, 8, A. M. Pulse 94, regular and strong; no pain in the stump, glenoid cavity entirely covered, appetite good, bowels regular, tongue clean, and sleeps well.

May 3d, 8, A. M. Pulse 90, regular and full, appetite voracious; very slight discharge of pus from the posterior counter opening.

14th. Discharged, cured, from the Hospital, the stump having become firm and entirely cicatrized.

Pathological description. The skin, subcutaneous adipo-cellular layers, and a superficial stratum of muscular fibres superiorly, are normal.

A minute inspection of the tumor, and the appearance of its structure as seen by the microscope, induce me to believe that the morbid mass is one of malignant or cancerous character. In this opinion I am corroborated by my former colleague, Dr. Bowen, whose pathological researches have been very extensive. The tumor, when laid open by a vertical section, presented a striated, dull whitish appearance on each side of the centre of the mass, which was itself occupied by the remains of the altered and disorganized tissue of the shaft and extremities of the humerus. The osseous tissue here seems to be disintegrated and expanded, by deposit and growth of a dense, striated, fibro-cancerous structure, which bears a very large proportion to the expanded and altered bone: on passing the hand over each surface of the section, bony material is felt to be interspersed in acicular and foliated lamellæ, through the entire mass of the tumor, as far as its periphery.

The head and upper part of the shaft of the humerus is atrophied and expanded to near the surface of the tumor. The spongy structure of this part of the bone is destroyed.

The spongy structure of the lower fifth part is in a state of commencing eburnation, dense but readily compressible.

The soft parts surrounding the bone have a striated appearance, the striæ assuming a curvilinear direction. These are more clearly defined as the circumference is approached.

The centre of the tumor is occupied by bony detritus, and by a substance differing from the tissues which it has replaced; and this is supposed to be a malignant deposit,—1st. Because there is a large increase of substance; 2d. This great increase took place rapidly after a period of apparently languid action—chronic inflammation; 3d. The new matter has but

slight resemblance to any of the normal tissues which it has infiltrated or replaced; 4th. There has been a destructive process at work, and the destruction gives no evidence of having been effected by common inflammatory action.

It may be contended that the tumor was not malignant, from the presence of white fibre and the inflammatory condensation of the lower end of the bone. But, in point of fact, there is no incompatibility.

In the progress of cancer two distinct processes are in operation: 1st. The deposit and evolution of cancer granules and cells; and 2d. Inflammatory action excited by their presence.

Cancer cells are necessarily perishable, but the organizable product of simple inflammation may be converted into tissues analogous to those into which it is poured, or in a lower organization, as, for instance, white fibre.

New fusiform developmental cells are said to abound in malignant growths, and are converted into fibres to form the stroma.

This is denied by some, as by Vogel; but he admits that new fibres and vessels are present, and thinks they are dependent upon the influence of the preëxisting fibres, just as is the case in the growth of pure fibrous tumors.

Mr. Paget observes, that exceptions to the general rule of the wasting of the infiltrated tissues are often observed in the fibrous tissues and in bone.

The examination of the morbid preparation also shows that the formative processes have occupied the circumference of the tumor, while the destructive action has been confined to the centre, where evidently the disease commenced.

New York, *July* 1*st*, No. 2 Waverley Place.

Sulphate of Magnesia in Nervous Fever. By W. S. Bowen.

I have heard, on three several occasions, of patients dying insane after attacks of nervous fever, so called.

This fever, as far as my reading extends, except in Doctor Graves' Clinical Lectures, is described as "Mild Typhus," "Mild Synochus," &c.; thus imposing it as a law upon these fevers to be nervous if mild, and leaving us to infer, if we please, that the milder the fever is the milder will be the delirium, the danger of insanity being proportionally great.

This nominal association with an asthenic disorder, combined with the apparently asthenic condition of the patient in the fever in question, led, I presume, to the treatment adopted in the cases I incidentally heard of, which was, mainly, anodyne, stimulant, and tonic.

The fever that forms the subject of this paper is not typhus fever, or

any modification of it; and anodynes, stimulants, and tonics are directly contra-indicated.

It is the "Nervous Fever" of Dr. Graves, only he dislocates it from its pathological centre, the inflammation of the hemispherical ganglion.

In the summer of 1838, I was summoned to a gentleman, twenty-six years of age, of spare habit and nervous temperament. (The case was not under my care as his physician. Dr. Dilworth had directed that I should be sent for, if required, during his absence for a day or two.)

When I saw the patient, he was laboring under extreme agitation. The skin was hot, and the pulse small and very frequent; he was delirious, but the delirium was peculiar; it resembled mental agitation, rather than aberration.

This occurred in paroxysms, which were speedily allayed by sulphate of magnesia, Dr. Dilworth's prescription.

There was some prostration, but this was not a marked symptom.

The patient recovered rapidly under this simple treatment.

July 31st, 1843, I saw a lady, æt. 17, plethoric, of sanguine and bilious temperament, muscular system well developed.

Since the preceding winter, she had suffered from scanty menstruation, which was attended with more or less, but constant, headache. For the last few days it had increased very much, and was most severe on the right side, preventing sleep.

She was delirious, with flushed face, eyes injected, pulse hard and rapid, skin hot, abdomen tender on pressure, bowels constipated.

Ice was applied to the head, mercurials ordered, and a febrifuge administered at short intervals, without producing any abatement of the symptoms.

Leeches were then applied to the temples, which afforded some relief; but she still remained sleepless, had spectral illusions, subsultus, and was greatly prostrated.

The right ear suppurated, and stupor, with muttering delirium, followed. Her sight failed.

Stimulants and anodynes were now given. They failed totally.

Reflecting on the case, I was struck with the similarity that existed, as far as the earlier delirium was concerned, between this and the first case. A wine-glass of a solution of Epsom salts settled the question. She became calmer, and during the night slept. A table-spoonful was given every few hours, or as often as she manifested any excitement. She recovered her sight.

Under this treatment she steadily improved. On the 6th of August, profuse perspiration put a period to the disease. On the 12th, she was gaining strength.

A young lady of fifteen, exceedingly frail and delicate, of nervous and sanguine temperament, was seized, in the early part of August, 1852, with vomiting.

For a week she had complained of headache and pain in the abdomen, which was tender on pressure. She was suffering from neuralgia.

The pulse was small and frequent, skin hot, tongue white, bowels constipated. She was restless and sleepless, had paroxysms of nervous excitement, which, without rising to positive delirium, were attended with increased febrile reaction, pain in the head and confusion of intellect.

Blue mass was ordered, a table-spoonful of spts. Mindereri directed to be given every two hours, and hyoscyamus at bed time, to be repeated, if necessary, every three hours.

In the morning the symptoms were aggravated, the fever, paroxysmal excitement, &c., being much greater, while alarming prostration was present and increasing.

I ordered brandy to be given, which still more aggravated the case. Wine was substituted with no better success, when again it occurred to me that this case also resembled the first in its general outline.

Sulphate of magnesia was given, with prompt relief. In a few days she recovered.

Dr. Graves,* referring to a case of nervous fever, remarks, that "the disease was a pure fever, of a nervous type, unaccompanied by any symptoms indicating decided local inflammation. The symptoms were heat of skin, quick, weak, compressible pulse, thirst, watchfulness, and low, muttering delirium, unattended by any appreciable sign of visceral disease, or any symptoms denoting a putrescent state of the fluids.

"It was not a congestive, or putrid, or gastro-enteric, or petechial fever, neither could it be called a cerebral fever.

"It was nervous fever, modified by the patient's long-continued intemperance.

"His treatment consisted in the employment of medicines calculated to soothe the nervous system. Sulphate of quinine and opium (found successful in similar cases) offered but a feeble hope of arresting the malady. It failed, and the man died, worn out by long-continued suffering and exhaustion.

"Eighteen hours after death, we made a most careful examination of all the viscera of the three great cavities. The man had all his viscera in an apparently sound and normal condition, and died of pure nervous fever."

A second case described by Dr. Graves, had "thirst, hot skin, pulse

* Clinical Lectures, Lec. XIII.

from 110 to 120, occasional delirium and watchfulness; and these symptoms went on, week after week and month after month, unaccompanied, during the whole course of the disease, by any phenomena indicating the existence of local inflammation.

"His treatment was purely expectant and temporizing.

"At last, after the fever had continued for very nearly three months, the man complaining all the time of more or less thirst, hot skin, watchfulness, and headache, with occasional delirium, the disease terminated in a well-marked crisis, accompanied by sweating."

A third case—"Never had a remission during his illness, was in very urgent danger, and got a perfect crisis, with profuse perspiration, on the forty-second day."

A fourth case*—"Had entered the hospital with a violent and general bronchitis, accompanied with high inflammatory fever."

Owing to the crowded state of the hospital, the patient was put into a "fever ward"—was relieved, and while convalescing took his discharge (January 15th), in order to vote at an election in Dublin. He was mercurialized at the time.

Ten days after, he was re-admitted, "complaining of rigors and other symptoms indicative of commencing fever."

The next day, Dr. Graves saw him, when he presented "great prostration of strength, hot skin, dry tongue, pulse 108, nervous agitation, restlessness, together with subsultus tendinum."

He died, exhausted, on the tenth day.

The case is summed up as follows: "Though his muscular system was irregularly excited, and its nervous influence deranged, he had not even a tendency to delirium, and he slept soundly; neither had he the least headache. I called your attention to this circumstance at the bed-side of the patient, and endeavored to impress on your minds how forcibly this case opposes the doctrines of those who attribute the nervous disturbance of every part of the system, and among the rest subsultus, to congestion or inflammation of the brain.

"When the subsultus had attained a degree of violence such as we seldom witness, we remarked, nevertheless, that he slept well, and that he was free from headache, heat of scalp, and throbbing of the temporal arteries.

"Agitated with subsultus, he was in a constant state of restlessness when awake; his skin was hot, his tongue dry, and his weakness was sudden and excessive.

"In short, he was laboring under intense nervous fever." (?)

* Lecture XVI.

Dr. Graves attributes the nervous type of this case to his exposure to cold while salivated, and to the excitement consequent upon the election.

As already stated, I conceive that the pathological condition upon which the phenomena of nervous fever depend is hyperæmia of the hemispherical ganglion.

This condition may or may not be attended by the results of inflammatory action.

Dr. Graves lays stress upon the fact that, after a most careful examination, he was unable to find the slightest trace of congestion. I take it, this remark will apply to very many cases of congestion, and even of inflammation, that have terminated fatally, in which the products of inflammatory action have not been thrown out.

The absence of vascularity, especially in the brain, should not disturb our faith in capillary hyperæmia, or induce us to place undue reliance upon high nervous action independent of the nervous centres; for such negative results have very often afforded a useful lesson to the pathologist, as Dr. Graves suggests they may; but they have been, by many, regarded in a somewhat different light from that which seems to prevail in the Meath Hospital.

The symptoms of inflammation of the hemispherical ganglion depend upon two conditions of the organ.

First—Hyperæmia.

Second—Stasis and exudation.

The first condition is characterized by exaltation of functional activity.

The second by its depression.

Many writers refer the first group of symptoms to inflammation of the membranes of the brain; but Mr. Solly has laid this question to rest: "It is impossible to separate inflammation of the membranes from that of the hemispherical ganglion, or cortical substance, of the brain."*

Nervous fever proper, I am inclined to think, is mainly to be attributed to excessive heat, as the exciting cause. It is a very rare disorder in the North, if we except those cases in which the patient is prostrated, without reaction, by long exposure to the direct rays of the sun.

May we not hope for a clearer statement of the fever, from Southern writers?

As to the remedy suggested in this paper, I would further remark that in hysterical convulsions—delirium ebriosorum of Solly—and those forms of sleeplessness that depend upon mental excitement, I am unacquainted with any remedy exercising so controlling an influence as sulphate of magnesia.

105 Ninth Street, *July* 31*st*, 1854.

* "The Human Brain," &c., 2d Edition.

Clinical Lectures on some of the principal Diseases of the Eye. Delivered at the New York Medical College, June and July, 1854, by ISIDOR GLÜCK, M. D., Cor. Fellow Med. Soc. of London.

[Continued from p. 22.]

AMAUROSIS.

Anatomy and Physiology of the Eye, accommodation of Sight, etc.

GENTLEMEN:—If you noticed the manner in which this patient entered the room, you cannot have failed to observe his exertion of seeking for light, although he was lead by his daughter. The widely opened eyelids, the almost angularly high drawn up eyebrows, further the horizontal folds (wrinkles) on the forehead, and the stretched neck holding the head upwards towards the window, are so many evidences of it. His walk, together with the rolling of the eyes, and, more yet, the deviation of the adductor muscles, may give you in some measure a hint for forming, if not the diagnosis, at least an idea of what nature the affection may be. Moreover, a glance at his eyeballs will inform you of an apparently sound state, if you except a slight discoloration in the background of the eyes, which is partly attributable to the natural change which takes place in advanced age,* and is frequently apparent even in middle-aged persons, like this patient, who is forty-nine years old.

But if you inquire into his condition of vision, you learn that he can discern light from darkness, but can neither see you nor perceive an object, excepting its shadow. His own story, as you hear, runs thus: "About two years ago, when driving, one morning, his cart, he observed all objects as if surrounded by clouds, misty and hazy. From that time his eyes grew dimmer and dimmer, until he arrived to this condition in which, since eight months, he sees but the shadow of objects, better in the evening, especially by moonlight, than in the day. He observed floating dots of different shape and form, passing along in different directions. Once in a while he had a shooting pain in his brows and head. He is regular in eating, but having worked hard he found it beneficial to take stimulants."

* With advanced age the transparent fluids of the eye loose in pellucidity and quantity. They become thicker, the lens becomes planer, more dense, yellowish, opaque, harder or softer, the vitreous humor denser and yellowish, the choroidea paler, and inclines even to ossification, the retina becomes thinner.—[*Lehrbuch der path. Anat. Bock*]

If you examine the eye as to its sensibility to light, you will find that the irides do not respond to the various degrees of excitement by light, but remain immovable.

The movements of the iris are involuntary, and depend upon the excitement communicated to it by immediate irritation of the oculo-motor, or reflected from the cerebral nerves on the brain, the medulla oblongata, and therefrom on the oculo-motorius, or from an excitement originating in the brain, medulla oblongata, or in that part of the spinal chord which is situated between the first and the third vertebra. The proofs of it are apparent from the fact that the pupil contracts after irritation of the conjunctiva, of the iris itself, and of other parts of the eye. But the light can only produce a contraction of the pupil when the retina is sensitive to its impression, which communicates itself through the means of the optic nerve on to the brain, which latter imparts the impression through the corpora quadrigemina (the central organ of the reflex action of the iris), on the nervus oculo-motorius. Hence the dilatation of the pupil and immobility in paralysis of the retina, even with undisturbed activity of the third pair.

Experiments made on animals prove that the sensation of light is imparted from the retina to the brain, and is reflected from these on the oculo-motory nerves. Mayo, Magendie, and lately Budge, cut through the optic nerve, and having irritated immediately afterwards the end not connected with the brain, found that the diameter of the pupil remained unchanged; but the irritation of the central end of the optic nerve was followed by a contraction of the pupil. The transcission of the oculo-motorius nerves by integrity of the irritated optic nerve, had no effect upon the pupil. Hence it follows that the nervous flow of the optic nerve is directed towards the centre and not the periphery, and that the optic nerve does not cause *directly* the movements of the iris, and that the nervus oculo-motorius is officiating and producing the movements of the iris, and causing its contraction. Amaurosis of one eye proves the same also: the reflected movements are communicated from the sound to the affected eye. The light does not exert an influence by being thrown on the iris. If no light enters the pupil the same does not change, but contracts or dilates if thrown on the sensitive retina. The movements of the iris are in connection and in some measure dependent upon the power of accommodation. The closer we look at an object the more the pupil contracts, and dilates, on the contrary, the further the observed object is situated.

In the normal condition of the eye, its background appears black, because the quantity of reflected light is too small* to produce a sensation in the retina of the observer's eye. Again, the returning rays having the

* Stèlwag Von Carion proved it by mathematical calculations based on optical principles.—*Theorie der Augenspiegel, Vienna,* 1854.

direction of those which *fall* in, prevent altogether the return of rays from the observed retina into the observer's eye, because they start from the same spot which is occupied by our own (observer's) pupillary image; as no rays return from the pupil which is directed towards a black pupil, it is natural and necessary that the pupil should appear black. Only by the reflection of our cornea, by irregular refraction and diffusion in the observed eye, by defraction on the pupillary margin, by pellucidity of the sclerotica, by the diffused light which falls on other parts from the illumined part of the retina, but chiefly by imperfect accommodation, in which no clear image is formed of our pupil,—some rays of light may return from the background of the eye into our pupil, usually, however, too few to illuminate the pupil; and hence the darkness. A discoloration of the pupil will inform you of some change either in the transparent media, or farther back on the retina, optic nerve, etc.

Although it is evident that these objective and subjective symptoms sufficiently characterize a condition which is called amaurosis, I should not venture to diagnosticate the absence of a cataract without a previous examination by the eye speculum. If you examine by the speculum his left eye, Gentlemen, you see the vessels branching in all directions from the centre of the optic nerve. Those running vertically up and down are larger, whereas the horizontal ones are smaller in size; but the color, as you see, is more a brown red equally diffused, and, more cloudy, and not as in the healthy eye. In the right eye you will have more difficulty in tracing the vessels, although they are in some measure apparent. If you use the positive lens, the branches will appear magnified; with the concave lens, you will observe the cornea and iris diminished, but the vessels enlarged. Of course the focal distance varies with the difference of refractive power of your own eyes. Some of you who are near-sighted will do well to look at it through your own glasses. The transparency of both lenses is apparent, of the vitreous humor in the left eye equally so; but the intransparency of the vitreous humor of the right eye, gives ground for supposition of its altered state. However, there is no complication with a cataract, which we should have observed by this means.

It may be well to recall to your mind before entering upon the nature of this eye disease, affecting more or less, directly or indirectly, the retina, the anatomical construction, and physiological importance of this membrane and its contiguous parts. Neither its anatomy nor its physiology is clearly made out, but enough is known of it to give room for speculations probably near the truth, which some day, with the further developement of our auxiliary sciences and the improvement of means for more accurate researches, may have to give way to other suppositions, and thus prove untenable; the conflicting opinions, however, agree in and admit the

chief features of its anatomical structure and physiological function. The retina is a nervous sheet, commencing at the entrance of the optic nerve, with which it is continuous, and is expanded within the globe, between the choroid coat and vitreous humor, and, becoming gradually thinner forwards, terminates abruptly at the ora serrata in an undulated margin which is intimately connected on one side with the choroidea, on the other with the hyaloid membrane. The retina is a delicate membrane, almost perfectly clear and transparent* during life and when recent, but whitish and opaque afterward. According to Bowman, to whose indefatigable exertions in anatomico-microscopical researches we are indebted for many correct views on the subject, the retina consists of elements common to the retina with other portions of the nervous system, which are placed *internally* towards the hyaloid surface of the retina; and elements peculiar to the retina, and placed *externally*. The former are:

I. Gray fibres, a continuation of the nerve tubules of the optic nerve from the entrance of which they radiate towards the anterior border of the retina. In the space occupied by the evolution of the gray fibres from the optic nerve, *i. e.* for the area of the inner orifice of the foramen opticum, the other strata constituting the retina do not exist, consequently this spot is insusceptible of stimulation by light, *i. e.* blind. Nerve tubules, such as form the optic nerve, do not exist as a part of the retina; where they enter within the sclerotica they are to be regarded as still the optic nerve in its course to the retina.

II. Gray nervous matter.
III. Caudate nucleated globules.
IV. Agglomerated granules.

The elements peculiar to the retina are situated externally, and together form the wall known as Jacob's membrane; these are,

V. Rods arranged vertically in a single series, and,
VI. Bulbous particles interspersed regularly among the former.

According to Kölliker's recent investigations in all parts of the retina, the following layers may be distinguished from without to within:

I. The *Baccillar Layer*, composed of innumerable rod-like and conical corpuscles, regularly disposed, and reflecting the light strongly. These two elements, the "rods" and "cones," constitute a single layer, which becomes thinner anteriorly. The "rods" are cylindrical, elongated corpuscles in which a larger external end—the proper rod—is to be distinguished from a more slender internal portion—the prolongation or "filament," which is a very

* According to Coccius, not perfectly so.

delicate process of uniform width throughout, prolonged immediately from the point of the "rod," and extends through the inner half of the Baccillar layer. The "cones" are "rods" which, instead of the filaments, are furnished at their inner extremity with a conical or pyriform body. Each of these "cones" consists of an external thicker and longer, finely-granular extremity, and of a shorter inner portion, in which an elevated, more opaque and brilliant body is enclosed. The "rods" and "cones" are arranged vertically upon the retina like palisades in close apposition, one of their ends being directed towards the choroid, the other towards the granular layer. Close to the macula lutea the "cones" form an almost continuous stratum, so that the "rods" are placed only in single series between them; but more anteriorly they are wider apart.

2. The granular layer, which is composed of opaque granular corpuscles, reflecting the light tolerably strongly; in the greater part of the retina they are disposed in two layers, an outer, thicker, and an inner, thinner.

3. The layer of cineritious cerebral substance, composed of a finely granular matrix.

4. *The Expansion of the Optic Nerve.*—Kölliker has not yet been able to demonstrate axis-fibres and sheaths in the fibres of the retina, although he would not from that circumstance at present conclude that they do not exist. As respects the course of the nerve fibres in the retina this much is certain, that they radiate on all sides from the colliculus nervi optici, and constitute a continuous, membranous expansion, which extends as far as the ora serrata retinæ, and presents any considerable interruption only in the situation of the macula lutea. In this true nervous membrane the fibres are associated into larger and smaller, compressed bundles, which either mutually anastomose at very acute angles, or run for considerable distances parallel with each other. They exist not only in front but in every part of the retina, because the layer of nerve fibres becomes visibly thicker from before backwards.

5. The limitary membrane, a delicate membrane intimately connected with the rest of the retina. This membrane, which Valentin considers to be an epithelium of the retina, and Hannover an epithelium of the hyaloidea, proceeds over the ora serrata, covering the ciliary processes and the posterior surface of the iris, to the pupillary margin, where it terminates.

The condition of the retinal elements at the "yellow spot" is in many respects peculiar. Any continuous layer of optic fibres is there wholly wanting, and the stratum of nerve cells, which are in close mutual apposition, lies immediately upon the membrana limitans. Between these cells run nerve fibres, from the sides and the internal end of the spot into it, and terminate in a way that cannot be accurately determined. In the centre of the macula lutea there is *a thin, uncolored spot in which*

the granular layer is wanting, through which the pigment of the choroid is visible, the so-termed foramen centrale. The plica centralis nerve exists during life; but this is not the case, probably, with the yellow color, which depends upon diffused pigment prevading all the parts of the retina except the "rods." The latter in this situation assume the form of cones exclusively, in as much as the proper "rods" are wholly wanting in the "yellow spot" and its immediate neighborhood. Instead of them, the cones form a perfectly continuous layer, and are more slender than elsewhere.

Children are generally born *without* a macula lutea. The yellowish color forms itself, according to Ammon, fourteen to sixteen months after birth, under the influence of light; and does not form itself if light is shut out, by a leucoma for instance; and turns pale again in advanced age. In dead subjects the macula lutea is found in the plica centralis retinæ, which is a double fold formed after death; by means of the eye-speculum you would recognize it if it existed during life; I myself never could see it during any of the numerous examinations I made with the eye-specula.

Respecting the mutual connection of the nervous retinal layers, Kölliker has ascertained that the fibres proceeding from the "rods" and "cones" inwards, and from the granules on both sides, are connected and simply constitute parts of a fibrous system of the retina. This system, the greater number of whose elements are vertical, penetrates the entire thickness of the tunic, and might be termed the *radiating fibre-system*, in contradistinction to the horizontal, referable to the expansion of the optic nerve. Proceeding from the Baccillar layer, it is obvious that the fine filaments arising from the "rods" and "cones" are directly continuous with the similar processes given off from the external side of the "granules" in such a way that the filaments of the "rods" are connected with the granules of the outer granular layer, and those of the "cones" with the "granules" of the inner layer; in fact, each "cone" or "rod" is in connection with a granule, the latter also perhaps with several. The radiating fibres either actually terminate in the filaments observed by Kölliker on the surface of the expansion of the optic nerve, or they are continuous with the true fibres of that nerve, or at any rate in connection with them. In a physiological point of view, the latter supposition would in any case be the most plausible; and, in support of it, it may be stated that in the true fibrous bundles of the retina, together with the varicose nerves tubules, there are fibres of another sort, which agree in all respects with the radiating fibres. It may be that these fibres are the direct continuations of the horizontal terminal processes of the radiating fibres, which subsequently, in their further progress towards the optic nerve, acquire more and more of the character of nerve tubules, and follow a more direct course.

Kölliker looks upon the "rods" and cones, which may also be said to correspond in all chemical characters with the nerve fibres of the retina,

and the whole of the radiating fibre system of the *retina*, as *true nervous* elements; and ventures at the same time to broach the bold supposition, as he expresses himself, founded upon a less established basis, which has been already thrown out, that the "rods" and "cones" are the *true "percipients"* of light, and that they communicate their condition to the fibres of the optic nerve, by means of the direct or indirect connection of their fibrous processes with the former, through which again the impressions are conveyed to the sensorium. That the optic fibres in the nervous expansion of the retina do not perceive light, appears to him be to proved by the circumstance:

1. That the point of the retina where those fibres alone and no other elements of the retina are found, viz. at the entrance of the optic nerve, is not sensitive to light; 2. That the optic fibres are *superimposed upon each other in such numbers*, in almost every part of the retina, and above all in the neighborhood of the macula lutea, that it is impossible that they should perceive light, inasmuch as each luminous impression, owing to the transparency of the fibres, must in any case always affect many of them, and consequently would of necessity give rise to confused sensations, and; 3. Because the part of the retina in which there is no continuous layer of nerve fibres on the inner surface, that is to say, the "yellow spot" is the most sensitive to luminous impressions. Under this notion the import of the "rods" and their remarkable arrangement would be intelligible, and the almost inexplicable correspondence in the size of the images of the smallest distinguishable interspaces between two objects with the diameter of the "rods" and "cones," be placed in its true light.

The vessels of the retina are the arteria and vena centralis retinæ, which enter in the axis of the optic nerve, the interior of the eye, forming in all directions arborescent ramifications. The branches, however, running upwards and downwards, are thicker than those running horizontally, as I have shown you repeatedly. In the circumference of the macula lutea, the branches form a coronary arch; but the macula lutea seems to be free of the vessels, at least by examining it with the eye-speculum. Kölliker states, that there are numerous capillaries in the "yellow spots." On the ora serrata retinæ is situated a circular vein (Gerlach), in which the capillaries situated on the anterior part of the retina inosculate. This vein presents this peculiarity, that only its posterior wall is connected with other vessels, whereas its anterior wall, turned to the zonula Zinii, is perfectly free of it.

This peculiar, independent arrangement of the vessels explains the independence of many inflammations of it, and the abundance of vessels the frequency of congestions, exudations, and extravasations, upon which, as traceable by the eye-speculum, amblyopia, amaurosis, and other defects of

sight depend. The choroid coat consists of three different layers;* the outer is made up chiefly of vessels connected by a peculiar kind of connecting tissue (stroma), in which numerous stellular pigment cells are imbedded. A capillary net expanded in a structureless membrane, forms the middle layer, while the innermost (membrana pigmenti), consists of polyhedric pigment cells, in albinos and white rabbits substituted by tesselated epithelial cells. The formation of the pigment begins after birth, and is confined to the stroma choroideæ, therefore all children are born with blue eyes, whereas it extends in brown eyes, on to the ciliary muscle and the stroma of the iris. The different coloration of the iris depends upon the quantity and the distribution of the deposited pigment.

On the outer surface of the choroid, between the same and the sclerotic coat, the ciliary muscle forms a grayish semi-transparent band, about one-eighth of an inch broad. It is thickest in front at its anterior edge, and becomes gradually thinner backwards, terminating in a line with the ora serrata, and corresponds, therefore, on its inner surface, to that striated and plicated part of the choroid in front of the retina, where the choroid takes hold of the vitreous body. The function of this muscle is to adjust the eye to distinct vision at different distances. The manner in which this is effected is, as yet, a disputed point. By contracting it is supposed to draw the lens forwards, to adjust the eye for near objects; while by relaxing it causes the lens to recede, to which movements the elasticity of the parts probably much contribute, and the eye is thus again adjusted as originally, for remote vision.

By many it is called tensor choroidea, as its effect is supposed to be the extension of the choroidea with the retina around the vitreous body, diminishing a closed surface, which is formed by the muscle itself, the cornea and the choroid coat; it lifts forward, at the same time, the zonula Zinnii, which is connected with the ciliary processes, and diminishes their tension in that region which lies between the lens and the ciliary processes.

In front of the ora serrata, the choroid coat exhibits on its internal surface, about two lines and a half from the cornea, a number of longitudinal folds,—the ciliary processes, which are arranged in a radiated manner, and reach the circumference of the lens.

The circular space left by the anterior terminations of the choroid coat, is filled up by the iris (regenbogenhaut), which consists of finely spread muscular tissue, covered in front by an epithelium, and connecting numerous vessels, nerves, and pigment. It has a peculiar arrangement of "parallel, larger and smaller," lines and fibres, proceeding from the circumference to the centre (dilator pupillæ), where they meet orbicular fibres (sphincter pupilæ).

* Gerlach.

The opening in the middle of this membrane is called the pupil. The function of the iris is to regulate the admission of the quantity of light, and to exclude the dispersed rays and those formed by the spherical aberration of the lens.

The cornea consists of five layers, the external, 1, forms the conjunctival epithelium, which is followed by, 2, an exterior elastic lamina, 3, the cornea proper, 4, a posterior elastic lamina, and 5, by the posterior epithelium, or membrana descemetii. The cornea and the membrana humoris aquæ, or descemetii, both of which are transparent, form a convex-concave, concentrating meniscus; the cornea is fixed into the sclerotica, which consists of white fibres, intimately connected with each other.

The refractive media of the eye form a system of lenses, constructed in such a manner as to form on the retina, under favorable circumstances, a defined achromatic image. The highly refractive lens included between two less refractive fluids (aqueous and vitreous humor), form, together with the cornea, the dioptric apparatus of the eyeball.

The Physiology of Sight.

Vision is effected in the normal eye thus: The rays of light passing from a luminous body through the dioptric apparatus of the eye, in a distance commensurate to its refractive power, are refracted in such way as to converge in the interior of the eye, and to meet in a focus on the retina, where it (the luminous body) is depicted upside down.* The image thus formed, if received by a sensitive spot (*macula lutea*), containing cones and rods, the perception of it is transmitted through the fibrous processes to the optic nerve, which conveys it then to the sensorium. The inversion of the image depends on the decussation the rays of light undergo, passing the highly refractive crystalline lens. The unity of vision of two images depicted on the retina, depends upon the decussation of the middle fibres of the optic nerves in the chiasma nervorum opticorum, and a probable simultaneous origin of both optic nerves in the brain. Single vision takes place only if *identical* parts of both retinas are affected by rays of light; while at once double vision occurs if different parts of the retina are affected, as you observe if you alter the optical directions by pressing one eye and looking by both. Identical are the centres of both retinas, as well as the parts equally distant from the centre of one eye outwards, and of the other inwards, or which are situated equally distant above or below the centre of the eye. The convergence of both

* You see in this eye, of which I remove the muscles and fat, the image of the flame I hold before the cornea, inverted on the retina, and diminished, through the transparent sclerotica. You may see the same in the living body; if you hold the candle before the eye of a child, directing the cornea outwards, the image appears inside, shining through the thin conjunctiva.

optical axes in a point of an object which corresponds to the distance of the accommodative power, is a necessary condition to the unity of vision. It may be assumed, without committing a palpable error, that the eye consists of three refractive media, which are separated by nearly spherical surfaces, which have their centres of curvation in the axis of vision. The first medium should be the *cornea* with the *aqueous humor;* the second, the *lens;* the third, the *vitreous body.* According to known optical laws, the rays of light will be refracted *to* the perpendicular in the first medium; this refraction will be the strongest in the eye because the difference of the density of the atmospheric air and the cornea is greater than the difference of the latter and the subsequent media, and of those amongst each other.* In the lens the rays are again refracted to the perpendicular in consequence of the great refractive power of the lens in relation to that of the cornea, whilst the rays diverge again in the less dense aqueous humor. But not all rays falling on the cornea will be transmitted; only those falling within an angle of about 48 degrees. The more oblique rays are reflected, and cause the sparkling appearance of the living eye, which necessarily must be introduced into portraits in order to give them a character of life; some of the reflected rays produce the image behind the cornea. The rays reflected by the cornea strike upon the iris, which shuts out the peripheral ones, which causes the brilliancy of the iris, and admits the central ones. The rays coming from the luminous body are refracted in such a way as to form a cone, the base of which is on the cornea and corresponds to a second cone, the apex of which is on the retina, only its central ray (direction's ray)—which corresponds to the optic axis—passes in an unaltered shape; whereas the others are refracted. The perception which is most distinct

* That the convexity of the cornea, and the refractive property of the aqueous humor, is of consequence to the function of vision, is evident, even regardless of the physical laws, from the construction of the eyes of land and water animals. The cornea is generally stronger in land animals, the lens less curved than in animals living in water; the aqueous humor differing much in density from the air but less from the water, it is natural that a very convex cornea, may much diminish the divergence of a system of rays falling upon it, or even convert it into convergency; while it is immaterial whether the cornea be convex or plane, when the rays passing from water fall upon it, because they can then be refracted, even by a highly curved surface, the difference of the refractive power, in both animals being very small. Animals, therefore, living in water, possess lenses of a high refractive power to effect the necessary degree of refraction; whilst in animals living on land, the greatest refraction takes place on the entrance of the rays through the cornea. The arrangement of the layers of the lens contributes in the latter animals to its great refractive power. Senff has shown that the lens whose nucleus is surrounded by less and less light-refractive layers, altogether refracts the light stronger than if it possessed throughout the high refractive power of the nucleus.

in consequence of the situation of the retinal image nearest to the axis of the eye, is called *direct;* whereas that which in consequence of the greater distance of the image from the central point is less distinct, is called *indirect.*

The field of vision includes the extent of the *direct* and *indirect* vision. The extent of the field of vision for the direct vision is determined by the movement of the eyeball in its orbit to all sides without turning the head, in which movement the axis of the globe may be turned in all directions within a segment of a circle of nearly 120 degrees.

Accommodation of Sight.

A distinct image of an object (whose different luminous points should be separately received) can only then be formed on the retina, if the divergence of the cone of rays corresponding to each point, after decussation falls exactly on the surface of the retina.

In order that objects in different distances should be distinctly seen, it is necessary that changes should take place in the eye, altering the refraction of the luminous rays, and thus accommodating the eye to the perception of a correct image of objects situated at various distances. That this does take place, you can convince yourself by looking with one eye at the ends of two needles, held separately for a distance, and covering each other: the first will appear clear if you look at it, and the second hazy; whereas the first will appear cloudy if you look at the second needle. The accommodation of sight depends not only upon the exertion of the ciliary muscle by drawing the lens forward, or at the same time making tense the choroid coat and retina, thus diminishing the space circumscribed by the cornea, ciliary muscle, and choridea, but is greatly affected on one hand by the effect of the movements of the iris, and on the other by the external ocular muscles, which, probably by their different combined actions, are capable of altering the diameters of the bulb, thus altering its refractive power. Recent investigations of E. H. Weber, prove the eye *not* to be entirely filled with fluids, which would serve in support of the possibility of a diametrical change. From the circumstance, that in healthy eyes it causes no pain to look at the distance, however long it may last, whereas to look at a nearer object for a time causes considerable exertion, which is followed by fatigue, one might infer the eye originally and naturally, to be accommodated for distances; and really, one comparatively seldom meets with myopic children, a state which develops itself more or less, from the manner of occupation, if the cause be not a congenital error of the highly refractive media.

The altered relation of some parts constituting the interior of the eye,

will have as a consequence a difference of their refractive power. If we reflect that according to measurements of Valentin, only a locomotion of one tenth of an inch is sufficient for the lens to accommodate its refractive power from four inches to an endless distance, we can have no difficulty in believing in the possibility of an adaptation by the locomotion of the lens; and, indeed, if you look close at the form of the iris which it assumes when, for instance, this boy or any one else suddenly accommodates his sight to the needle held near his eye, after having accommodated his sight to a distance, you will perceive that the iris assumes a convex shape, as if protruded by the lens or pressed by a voluminous cataract. That the accommodation of sight does not depend wholly upon the ciliary muscle, which has its controlling antagonism not only in the elasticity of the parts, but even in the activity and movements of the ocular muscles, may be proved by the fact that patients operated on for cataract—or, better, after entire removal of the lens—do retain or regain the power of accommodation in some measure.* The instillation of atropine drops into the eye debilitates the accommodative power for near objects, not only by disturbing the equilibrium of the dil. and sphinct. muscles, thus dilating the pupil, but by impeding the activity of the ciliary muscle. That the ocular muscles (rect. and obl.) contribute† to the accommodation of sight, may be proved by the myotomy which in many instances reëstablishes the sight immediately after the operations, and often improves it considerably if there existed any. I believe that even the orbicular muscle contributes to it, from the fact that persons in fixing a near object succeed much better in seeing, by compressing the eyeballs *suddenly*, thus diminishing the palpebral aperture, than if this is slowly effected. In such instances it is not the exclusion of the diffused rays of light which corrects the sight, as this would be effected equally by closing the eye gently, but to the alteration of the diameter the closer sight is thus attributable.

A deviation from the normal function of vision marked as an impairment, or the entire loss of sight, not dependent, however, upon intransparency of the cornea, aqueous humor, or lens, is called respectively amblyopia and amaurosis. Amblyopia differs from amaurosis only in the degree of the disturbed function, and both may originate from the same cause. Both

* E. Jaeger, "Ueber Staar und Staaroperationen," 1854, page 115. According to measurement instituted with the streaked scale (Strichscale), a great number of patients operated on for cataract have shown, often even after a few weeks, an accommodation of sight.

† Professor Arlt asserts that it is effected by the tension of the oblique and rect. muscles. When the muscles press the bulbus becomes smaller, the vitreous humor makes room in all directions, chiefly backwards and forwards, the lens cannot advance or the cornea should have to support a greater pressure, the ciliary muscle contracts, the pupil becomes smaller, and hence is effected the retrogression of the vitreous body further.—*Vienna Med. Woch., June*, 1854.

may be produced by direct or indirect causes altering the organic structure of the eye and its contiguous parts, the optic nerve, brain, etc., or result from a disturbed function of neighboring or remote organs. The functional disturbance may be followed by or precede the organic change, or both may coëxist. The eye being a repetition of the whole organism, containing all the textures met with in other parts of the body, it is necessarily exposed to all possible organic changes and functional disturbances similar to those met in the body elsewhere. Moreover, as its anatomical construction present sa modification of similar textures, and its function being a peculiar one, a disturbance will result from minute causes scarcely worth noticing in other organs. As, however, there exists no strong line of demarcation between many of the causes producing this affection, the result of one cause giving rise to another,* and being combined and associated with each other in various ways, a precise and exact division of this affection will not be possible, even if the changed anatomical construction of the eye and neighboring parts, and its disturbed function and that of other organs, should be chosen for a base. It may, however, facilitate you in gaining a general outline of the causes producing the affection, if we retain this latter as the base of a general division. The causes producing amblyopia and amaurosis may be *organic*, *direct*, and *indirect* ones; it may be caused, by wounds of the orbita and fractures of it; within the orbita it may be produced by exostosis, hydatids, aneurism, tumors (albuminous, fibrous, sarcomatous, cancerous, etc.) which either compress the retina or the optic nerve, or stretch it by protruding the eyeball, and thus alter the diameter and relative position of the media. It may be induced by thickening of the sheath of the optic nerve extending into the orbita, by inflammation, softening and atrophy of it.

II. Within the eyeball, it may be caused by a congestion of the choroid coat or the retina. This cause, Gentlemen, is a *very frequent* one of amblyopia and amaurosis. It may be produced by inflammation of the choroid coat (mostly partial), and the various causes resulting from it (as paralysis of the ciliary muscles).† It may be produced by localization of the different products on it out of the vessels of the dyscrasic blood in syphilitic, tuberculous individuals, thus infiltrating the parenchyma of the choroid coat, and by subsequent resorption of its fluid constituents leaving more solid and dense parts formed variously and observable by the eye speculum; or, as

* The organic change to the functional disturbance, and *vice versa*.

† Choroideitis is one of the most frequent and most dangerous eye diseases; and probably the cause of amaurosis glaucomatosa, the infl. extends but rarely on the whole extent of the choroidea, and attacks mostly the anterior or posterior part of it: the iris and retina, or one or both, may be affected at the same time. Its product is fibrinous or albuminous.—*V. Hasner.*

consequences of retinitis,* which may induce it also, induration, softening, atrophy, hypertrophy, ossification, and other changes consequent upon deep-seated inflammations of the eyeball pressing on the convex or concave surface of the choroid coat or retina. Further, it may be induced by aneurism of the central artery of the retina, by apoplexy or obliteration † of it, by concussions or laceration of the retina, by hydropthalmus, by an altered state of the hyaloidea in the thickening of it, and by a morbid change of the structure and density of the vitreous body, which is by no means a rare cause, but was less known as such before the use of the eye speculum.

III. Within the skull, it may be produced by depressions attending fractures of the skull, by tumors situated on its internal surface or on the dura mater, and by various other diseases of the head consequent upon inflammations of the brain or its coverings, such as induration, softening, suppuration, tubercles. It may be induced by concussion of the brain produced by gunshot or other wounds of the head, by congestion and enlargement of the cerebral vessels.

Amblyopia and amaurosis may be produced from functional or organic derangement of other remote organs. It is often associated with uterine disturbances, amenorrhœa,‡ dysmenorrhœa, metrorrhagia. It may be produced by plethora, and by general *anœmia* or its consequences. Amblyopia may be produced by worms in the intestines, or diseases of the alimentary canal, by the irritation of the sympathetic nerve, thus reflecting through the spinal marrow the fibres influencing vision. Amblyopia may be induced by an anomalous quality of blood, as in albuminary hydrops,§ where it is almost the first symptom.

All circumstances tending to alter the quality or quantity of blood, and thus depress the constitution, or increase the vitality of some or all organs, may contribute to the development of amblyopia or amaurosis. The same holds good of the nervous system; *i. e.*, circumstances causing increase or diminution of the nervous system, generally or locally, may contribute to

* *Retinitis* may have as its result a coagulable and organizable exudation, as well as a purulent and sero-plastic one. As a further consequence of such an inflammation, is a permanent enlargement of its vessels, softening (malacia) atrophy of the retina and the optic nerve.—*Lehrbuch der pathologischen Anatomie, Dr. C. E. Bock*, 52.

† Guthrie and Ammon.

‡ Prof. Barker informs me that he met, in his private as well as clinical practice, about a dozen of cases of amblyopia and amaurosis as a result of amenorrhœa; many of them improved, and some even were entirely cured, by the establishment or re-establishment of the menstrual courses.

§ Landouzy.

the development of the affections under our consideration. The reciprocal reaction of the condition of one system on the other, will naturally influence it. You may perceive by this, that the division of amaurosis is only a conventional one, according to the many divisions existing in the medical science. You can neither bring all under the head of nervous or blood diseases, or both together, nor attribute it always either to local or always to general causes. The combinations of all such causes being manifold, it is evident that a strict division is scarcely possible.

Amblyopia and amaurosis may be divided in—

1. Congestive,
2. Erethic, } Congestive.
3. Torpid, }

Amblyopia and Amaurosis in general.

The symptoms of amblyopia and amaurosis are objective and subjective. The objective symptoms are more or less confined to the iris and the state of the pupil, if we abstract from the examination with the eye speculum, which is the most important means of establishing the diagnosis.

The movements of the iris are dependent upon the reflex action of the sensitive and sympathetic nerves on the motory nerve. According to Magendie and Budge, the contraction of the pupil which is consequent upon the influence of light on the retina, has a central organ in the corpus quadrigemina, which stands in relation to the optic nerve and oculo-motorius as the spinal marrow to the sensitive and motory roots of the spinal nerves. With the extirpation of the corpora quadrigemina, contraction of the pupil, through the influence of light on the retina, ceases. The corpora quadrigemina on one side influence the movements of the iris on both sides, so that the extirpation of the corpora quadrigemina on one side, may be followed by movements of the iris produced by the influence of the corpora quadrigemina, on the other side. The dilator pupillæ is provided with branches belonging to the nervus oculo-motorius, whilst the sphincter pupillæ seems to be provided with fibres running in the same way, but not belonging to the oculum, which seem to take their origin separately in the brain; at least, the observation that in paralysis of the oculo-motorius, the pupil may retain its movements, speaks for it. Extirpation of the ciliary ganglion, or destruction of it by disease, causes dilatation and immobility of the pupil. The sensitive nerves providing the eye are the first and second branch of the trigeminus, which not only cause the sensation of

all parts of the eye provided by them, but decidedly influence the circulation of the blood, the secretion, the absorption, and the nutritive process of the eye in general.

The sympathetic nerve exerts its influence on the eye chiefly by means of the *ciliary ganglion* and some other branches. The sympathetic nerve performs its function, as anywhere else, by influencing the activity of the blood-vessels, and governing the chemical organic process, and probably even the involuntary movements of the iris, chiefly those which cause the dilatation of the pupil.

The iris receives its primitive fibres not only from the oculo-motorius and trigeminus, but from the superior cervical ganglion; the fibres coming from the ganglion have their central organ, according to Budge and Wagner, in that part of the spinal marrow which corresponds to the first three thoracic vertebræ; because irritations of the sympathetic nerve above the first cervical ganglion along its whole way as far as the ciliary ganglion, produce dilatation of the pupil, whilst irritations of the thoracic and abdominal part of the sympathetic nerve produce no dilatation of the pupil. If, however, dilatation of the pupil does take place in consequence of such an irritation, it is effected by reflex action from the spinal marrow.

The nervous fibres of the iris coming from the trigeminus and sympatheticus seem to stand in an antagonistic relation to the nervous fibres of the oculo-motorius. Paralysis or dissection of the trigeminus and sympatheticus caused an increased influence of the oculo-motorius, and therefore contraction of the pupil; whereas irritations of the sympatheticus diminish the influence of the oculo-motorius, and cause therefore dilatations of the pupil. Irritations of single branches of the trigeminus, chiefly of such which are in nearer relation to the ophthalmic ganglion, communicate their irritation to the sympathetic nerves of the iris, and *thus* cause dilatations of the pupil; whereas intense irritations of the whole ophthalmic ramus, or even of some other branches too, reflect in a higher degree on the oculo-motorius, and *thus* produce *contraction* of the pupil.

The dilatation, therefore, and contraction of the pupil, is dependent upon the prevalence of the activity of one or the other antagonistic forces and the influence of the sympathetic nerve. You will, therefore, meet, Gentlemen, amaurosis with dilated pupils, and amaurosis with contracted pupil, or of a middle size, or perfectly round, or angular, and drawn more towards one direction, according to the influence the corresponding nerve-fibres, producing and directing the movements, may exert, on the whole or part of the iris. But not the nerves alone and their state influence the movements; the vessels of the iris and their state modify the movements, or contribute to its degrees. The congested state of the vessels may influence it greatly, and even suspend it. The pupil in this patient is of a mid-

dle size, not round, but more oval in the right eye, and somewhat angular in the left eye. If separately examined (by closing one eye), neither of the irides reacts to the influence of light, as you see when I produce with my hand a shade before the open eye, and remove it suddenly. In amblyopic patients, who have some sight in one eye, it is of consequence to close it when examining the affected one, as the movements of the sound one may be communicated to the affected one. Some ophthalmic surgeons content themselves with closing the eye to be examined, by the lid, without apposition of the hand; which is a mistake, as light passes through the eyelids, and does not produce such a contrast with the shadow as when covered with the hand. The slightest reaction will show itself in the eye *thus* examined. The investigation with the eye speculum permits the examination of the living retina, and it was stated by those* who made examinations with the eye speculum that most of the cases hitherto observed have shown morbid changes of the retina, whilst in those where no change was traceable, a central cause is assumed to exist. The results of retinitis and chorditis will be visible in form of different deposits, traceable by the eye speculum, spots of different form, extent, and color.

Congestion of the vessels will be to a *certain degree* apparent. One commits an error in assuming, as it is lately often done, a congestive state of the vessels, if no other cause traceable by the speculum is found; although comparatively you may see in the same individual in both eyes a different appearance, the congested state of which will be apparent, still the enlargement of the vessels being as relative as the difference of the red color in the different eyes, it will not always be possible to assume the existence of such a state unless the developement of a comparatively high degree of the general plethoric habit, or other causes locally enlarging the vessels, justify such a diagnosis. Although there exists some independence of the circulation in the capillary system of the arteria centralis retinæ, favoring, under certain conditions, a stagnation of blood, it nevertheless is in intimate connection with the general system carrying blood. The developement of the arteria centralis and its capillary system is different in different individuals, respecting the calibre of its vessels; and although the chief branches, running up and downwards, are more or less alike, still their dimensions alter and vary in number as well as size. If you look into my right eye, you will discern the much-developed arteria centralis retinæ and its branches, by the eye speculum, even without the pupil being dilated by bellad., and without the use of a magnifying glass; and still my sight is perfectly good. In other individuals the same arrangement and enlargement of the vessels may be a sufficient cause for congestive amaurosis. This shows you, therefore,

* Helmholtz, Donders, Ruete, Hoyack, Tilanus, E. Jaeger, Van Trigt, and Schauenburg.

that it is not always advisable to content ones'self with the sight of enlarged vessels in order to establish a diagnosis of amaurosis. True it is, that a stagnation of blood will cause an enlargement of vessels, and the abundance of blood may be looked upon often as a cause of amblyopia, or even as producing amaurosis.

If you examine the eyes of this other patient (the woman) you will find in the right eye as well as in the left eye, but considerably more in the latter, large, distended vessels running in all directions, the horizontal ones scarcely much less in diameter than, under ordinary circumstances, the vertical ones appear; and if you look at it patiently you can observe, even without a magnifying glass, a change taking place sometimes in the dimension of the lower branch; the imperfect sight she complains of, which becomes at times so bad that she can scarcely see and every thing turns black before her eyes; the flashes before her eyes; the sluggish movements of the pupil, will admit, taking into consideration the transparency of the dioptric media, the diagnosis of a *congestive amblyopia;* the more so, as the stout, plethoric appearance of this red (I mean rosy) cheeked woman, who complains of cerebral congestion, favored by the excessive heat, chiefly when suffering, as she often does, from constipation, speak for its probable existence. The subjective symptoms are pains across the eye brows and forehead, coming on sometimes in certain intervals, mostly irregular, sometimes shooting pain in the interior and different—often dependent in degree and intensity—from the cause producing amaurosis.

In the beginning of the disease the patients see objects imperfectly, misty, dim as this patient did see, the patients complain of the light being too weak or (in those in which the sensibility of the retina is increased by too strong a light); the haziness and cloudiness increase; the objects appear gradually, sometimes suddenly, dimmer; the letters of a book, when read, seem to run into each other, the eye feels soon tired. Vision is impaired in the most different ways; the perception is an anomalous one, or the representation by the mind may be a defective one; the objects appear variously distorted, and are perceived differently from what they really are in regard to form, color, proportion, and relation to each other. Various kinds of spots are perceived as moving about, called motes, mouches volantes, like those the patient complains of, or confined to one spot (scotome); the sight diminishes until vision is entirely abolished, and the patient perceives not even the strongest light falling into the eye.

Mouches Volantes.—If the rays of light fall into the pupil in a convergent direction and form a cone of light, corpuscles contained in the eye can be observed in ones own eye, but only such as are smaller than the pupil and are situated close to the retina; there are as many cones of light and as many points depicted on the retina as luminous

points of an object send rays of light into the eye. An opacity in the cornea or crystalline lens in the form of a dark spot, which is smaller than the pupil, might prevent the entrance of some rays of light of one or several different cones, but could not make entirely invisible a point of the object, i. e. throw a shadow on a part of the retina, as the other rays falling undisturbed into the eye are sufficient to depict on the retina the perfect but somewhat darker-appearing image. But if small or dark corpuscles, which refract the rays of light differently from the normal, transparent, dioptric media, are situated close to the retina, the former may produce an irregular refraction, and consequently cause the appearance of colors or throw shadows on the retina and thus make invisible some spots of the object. The closer such an irregularly refracting and light-absorbing corpuscle is situated to the retina, the smaller will be its shadow thrown on the retina, whereas it will be greater, paler, the further from the retina the corpuscle exists. The materiality of these scotomes can be proved by the following circumstances: similar mouches volantes move in a direction independent of that of the eye; by a considerably strong movement of the eye the same may be directed higher (a little to the side) but they return and seem to sink after having mounted. If the axis of vision is directed in a certain point in the field of vision, after a forcible movement of the eyes, one perceives that the movements communicated to them by the direction of the eye is inconsiderable as they become soon quiet.

2. They change their relative position in regard of the singular parts of the figure, as well as in regard of their situation in the field of vision.

3. The layers more distant from the retina are more clearly larger, and have a more faded margin, than those situated closely.

4. The beads form often distinct loops, and this string of beads which crosses the other, situated nearer to the retina, forms a concave arch turned towards the retina, which appears paler and more cloudy than the rest of the string, being a little more distant from the retina, and throws therefore a less marked shadow on it.

5. Its original form is always the circular, and its shadow depends upon the intensity of the light.

6. They refract the light like a drop of water, which appears, under the microscope, with a dark margin whilst its centre is illuminated. This dark margin throws a shadow on the retina, which has, in some scotomes, a dark centre. The less the intensity of the light, the darker the shadow appears. The motes, or mouches volantes, present the most different varieties in shape, size, number, and color. Sometimes they are streaks, or lines, straight or angular, variously colored. Often they resemble forms reminding of insects, as a spider, or worm, etc. Their appearance is not always a symptom of an affection of the eye; they do exist in many without

injuring the sight, although they are annoying. I am myself annoyed by such mouches volantes appearing in my left eye; after long exertion of accommodating to a near distance, or any other cause producing a greater congestion of blood to the eye, or generally to the brain, I see a globular form mounting and descending, like pearls, whereas my sight is not troubled at all.

The appearance of motes may be produced artificially, by holding a card, perforated with a fine needle, towards the clear sky, or against a surface reflecting the light strongly, and looking through the hole; a very fine linen, held in the same way, will produce them. In some pathological conditions of the eye, they appear in the same way; for instance, when the cornea is anomalously vascular; the capillaries act in the same manner as the fine filaments of linen. They appear in congestion of the retina frequently, or by increased sensibility of the retina.

Ruete considers (from the existence of motes more or less constant even in healthy eyes, and probably dispersed through the whole of the eye, but perceived only under certain circumstances, and merely those situated in the vicinity of the optical axis, close to the retina) these corpuscles a kind of cells, as a morphological product of a substance forming and nourishing itself, and thus corresponding with the change of elements and the general nutrition of the eye. The frequency with which they appear, and the attention paid to the appearance, increase the annoyance and make them yet more troublesome.

The perception of the images depends upon the sensibility of the retina. If the latter is dynamically or materially altered, or if its connection with the optic nerve is interrupted, blindness, defective perception, or disturbance of the visual power does take place, in consequence of inactivity or qualitatively altered action of the nervous apparatus of the eye. If the retina is in a state of torpor, small objects will be seen with greater difficulty, although the other constituents of the eye be in a healthy condition. If parts of the retina are paralyzed, the same do not communicate the received impression to the sensoria, and therefore appear other points of the object corresponding to the affected part, as *dark* spots on the object, which become the more apparent the healthier the other parts of the retina, the nearer they are to the optic axis and the intenser the objective light is. On the contrary, they are not apparent in an obscure light, or by closed eyes. The movements of those dark spots are not, like the mouches volantes, independent from the movements of the eye, but coincide with the directions the latter takes. If the paralysis does extend on the half of the retina *hemiopia*, half sight, takes place. If paralysis takes place only in one eye, which frequently occurs after wounds and local diseases in the eye, the

spots appear *dark only* when the sound eye is closed, and cloudy if it is opened.

The perception of dark objects on light ground is to be compared with the perception of the dark spots caused by partial paralysis of the retina, for instance the reading of black letters on white paper. The objects are dark if they absorb all the light falling on them, consequently the retina cannot be stimulated by them; the corresponding parts of the retina remain therefore in the state of relative tranquillity; this tranquillity is projected and received by the mind in the form of the outline of black objects. The perception, therefore, of black objects depends exclusively upon a subjective process.

Congestive amblyopia and amaurosis may be produced by all local or general causes effecting a greater congestion of blood to the eye. Local hyperæmia may be induced by every cause producing an enlargement of the smallest capillary vessels, which may exist in the walls as well as in the contents of the vessels, and in its nearest vicinity, or in more remote parts (in front of, or posterior to the congested part), and may be found in the increased pressure of the blood, or in the diminished resistance of the walls. The pressure of blood may be increased, in consequence of the accelerated conveyance of the blood from the arterial side, or may be caused by an impediment in its flow towards the venous side. Increased or diminished activity of the heart may, therefore, produce congestion to different organs, and consequently, also, to the eye. The altered state of the blood, regarding its quality and quantity, will naturally react on the nervous system accordingly. This form of amblyopia and amaurosis occurs frequently in plethoric as well as in anæmic individuals, and may be associated with general cerebral congestion, or be produced in consequence of a peculiar position of the head, as in miners, or in consequence of an exertion of the eye on minute objects, as required in the occupation of miniature painters, goldsmiths, watchmakers, jewellers, and seamstresses, who are compelled to stoop more or less. The use of spectacles and glasses, concentrating the light too strong, may produce this affection; suppression of the hæmorrhoidal and menstrual flow, diseases of the valves of the heart, tumors in the stomach, or whatever cause impeding the circulation, may induce such a state of sight.

Wirchow asserts that every local pathological process results from a modified nutrition, and is associated with changes of the exudation and resorption (therefore chiefly inflammation): it exists on impairment of the conditions of diffusion between the blood and textures, according to which one or the other is increased or diminished, nutrition being mainly dependent on two currents of fluids, the one proceeding from the capillaries into the textures, the other from the textures into the capillaries, in certain conditions of diffusion. Used-up elements of texture become resorbed, whereas new

constituents of the blood exude. An altered capillary exudation must take place in every congestion.

Erethic and *torpid* amaurosis may be induced both from causes depressing the powers of life, and thus exhausting the constitution, as direct loss of blood, or in females, copious metrorrhagia, insufficiency of nourishment and its consequences, or sudden abstinence from accustomed stimulants, or nervous exhaustion dependent on sexual intemperance, or diseases of the spinal chord; or it may be induced by causes producing locally, in the eye, erethismus or torpidity of the retina, as over-exertion of the eye, be it through the abuse of spectacles, continual and protracted microscopic observations, or examination by the eye speculum; or it may be further caused by every excessive illumination, be it from the reflected light on the retina from the eye speculum, or observations of solar eclipses, or the glare of a tropic sun, to which sailors and travellers are sometimes exposed; or it may be caused by the reflection of light from the long-continued snow. It frequently occurs in engravers, polishers, jewellers, who have to look continually on the reflected intense light from the smooth and glaring surface, or in jewellers and watchmakers, who have to look continually on well-illuminated, minute objects, with the use of magnifying glasses; generally it is met with in seamstresses, who exert their eyes in sewing dark materials by too faint a light, or reflecting, white material too strongly illuminated: all causes, therefore, augmenting or diminishing the sensibility of the retina, and thus exhausting it, may produce erethic or torpid amaurosis. It is self-evident, that the vascular system of the eye is adequately influenced by the morbid functional alterations of the nervous system, be it in consequence of general or local causes. In the absence of a local cause, we are justified in assuming a central cause producing amaurosis. A morbid mixture of blood can not exist without an injurious effect in the circulation, respiration, and innervation. In anæmic individuals you will find pallor of the parts rich of blood, as of the lips, gums, palpebral conjunctiva, tongue, and cheeks. Menstruation ceases, or sometimes morbid hæmorrhages take place, in consequence of the greater liability of the badly-nourished walls to be broken through, chiefly epistaxis and hæmorrhages of the uterus, nun's murmur, blood in the heart and arteries, diminished heat in feet and hands, shivering, bad nutrition of muscles, flaccid flesh, sensation of fatigue and short breath after small exertion, slow digestion, obstruction.

Nervous symptoms occur in consequence of bad nutrition of the nervous system (headache, vertigo, darkening before the eyes, syncope, ringing in the ears, heart-beating, morbid appetite, spasms). Causes of such a state are mostly debility, mental depression, want of food, protracted lactation, debauchery, excessive discharges, as from abscesses and ulcers, subterranean and damp dwellings, insufficient light, sedentary life, and deficient air and exercise.

You observe, gentlemen, how intimately connected ophthalmic medicine and surgery is with the studies of anatomy, physiology, and pathology, on which the treatment is based; the eye being in intimate connection with the other organs, and its functions in some measure dependent upon them, consideration must be had of such circumstances, as the *ophthalmic surgeon* sinks to a mere "oculist," who empirically treats but the eye, as a mere optical instrument, dependent upon itself, regardless of its intimate connection with the other organs of the body, and their influence on it, irrespective of all the pathological processes, which are similar to those in other parts of the body.

Remarks on the Pathology of Infantile Laryngo-tracheitis, or Croup, as the basis of its rational treatment. By E. R. PEASLEE, A. M., M. D., Professor of Anatomy, &c.

(Concluded from the August No. of the Monthly, p. 102.)

PART II.

The treatment of Infantile Laryngo-Tracheitis, or Croup, as rationally based on the preceding views of its pathology.

The *indications* in the treatment of infantile laryngo-tracheitis, or croup, are at once suggested by the following recapitulation of the prominent points of the preceding part of this paper.

1st. Croup is always a laryngo-tracheitis, or inflammation, not of a specific kind, of the mucous membrane of the larynx, extending thence into the trachea, also, at least.

2nd. Like other inflammations, it may be either sthenic or asthenic.

3rd. Its progress is always downwards in the air-passages, whether it commences in the larynx, or (as is more frequently the case) higher up.

4th. It is always attended by an exudation of plasma upon the surface of the inflamed membrane.

5th. The inflammation subsides in the part on the occurrence of exudation.

6th. If the plasma *remains* on the surface (it being usually detached and removed in case of the adult, by coughing), it may

a. Become re-absorbed, which is a rare result; or,

b. Be converted into purulent matter, and then excreted; or,

c. Become organized into a false membrane. This last result is far more common in early life than in adults, though then occurring only in about one-sixth of all the cases. Consequently it can never be pre-

dicted, at the commencement of the disease, whether a false membrane will, or will not, be formed.

7th. If a false membrane is formed, it will become spontaneously detached, if the patient's life is sufficiently prolonged. Its removal, however, in whatever way effected, does not *insure* recovery.

8th. Laryngismus is associated, to some extent, with true laryngo-tracheitis, as a matter of course.

9th. Catarrh generally precedes infantile laryngo-tracheitis. But the catarrhal discharge, *so-called*, during the more advanced periods of this disease, is the purulent fluid formed by the degeneration of the exuded plasma.

10th. Diphtherite, or the "croup of adults," differs not *pathologically* from infantile laryngo-tracheitis. Generally, however, it is an asthenic form of laryngo-tracheitis, since it usually attacks persons already debilitated by other diseases.

The *indications* in the treatment of infantile laryngo-tracheitis, which flow from this view of its pathology, are as follows:

I. To arrest the inflammatory process, and control the laryngismus.

II. To prevent the organization of the exudation into a false membrane.

III. To remove the false membrane, if formed.

IV. To support the patient's strength, so far as may be, through the disease.

I. *Means for averting the inflammatory process.*

We here include:—

a. Blood-letting.

b. Tartrate of antimony, nitrate of potassa, mercurials (?).*

c. Emetics (?).

d. Expectorants (?).

e. Counter-irritants (?).

f. External application of cold.

g. Applications internally to seat of inflammation.

a. Abstraction of blood. In a clear case of sthenic laryngo-tracheitis, two or three leeches, according to the patient's age, may be applied to the throat or the top of the sternum, and the bleeding be promoted by a cataplasm; but it must be remembered that 3 oz. of blood lost by a child six months old, is more, proportionately, than 1¼ lb. lost by an adult, and that children generally manifest but a slight tolerance of blood-letting. Moreover, it must be remembered that this remedy is applicable only for the sake of arresting or removing the inflammation, and is therefore entirely out of place after the exudation is poured out, and the progress of the inflammation is thus

* The remedies marked (?) are of doubtful value for fulfilling this indication.

arrested. The only fact in favor of its adoption after this has occurred, is, that as the inflammation progresses *downwards*, it may still be advancing below the point covered with the exudation. This will be indicated by the state of the pulse, and of the respiration, and by other concurrent signs. But the presumption always is, that blood is *not* to be taken in the absence of decided reasons to the contrary.

Venesection, we believe, to be very seldom proper in a patient less than 7 years old; and blood should not be taken, in any way, in asthenic cases.

b. Tartrate of Antimony. It is a fact never to be overlooked in the treatment of inflammation, that the tartrate of antimony may be so administered as to become a most valuable substitute for blood-letting. I allude to its powerful effects as a *sedative*, when administered in small and frequently repeated doses, *e. g.*, one-thirtieth to one-twentieth of a grain dissolved in water, administered every hour or two, to an infant of twelve months, until the pulse becomes softer and slower, and the surface cooler, when the frequency of the doses is, of course, diminished, so as merely to continue this effect. In this way the reducing effects of loss of blood are produced temporarily, and till the inflammation is arrested; with the advantage over blood-letting, that on withdrawing the remedy, at any time when desired, the circulation rises again, and all permanent debility is prevented.

The effects of this remedy are, however, to be watched with the utmost care. Some infants easily yield to its sedative effects, and in some, violent irritation of the alimentary canal is produced by it. An infant, six months old, has been destroyed by one-thirtieth of a grain of this remedy; and another barely escaped with life, after taking, in three doses, sixty drops of the hive syrup. If given to the amount to produce vomiting, its sedative effect, as is well understood, is not experienced. It is better tolerated in combination with very small doses of an opiate.

Nitrate of Potash.—This remedy should hardly be relied on as a sedative in infantile laryngo-tracheitis, unless in asthenic cases, and also when from a peculiar irritability of the alimentary canal, or some other cause, the tartar emetic is not well borne. In such cases it may be given freely in solution, with some probable effects in averting the inflammatory process. The entire inappropriateness, however, of this remedy, and still more of blood-letting and antimony, *after* the exudation has occurred, and the pulse has fallen, will be apparent to all. (See August No. of Monthly, p. 98.)

Mercurials, especially Calomel.—This will be considered under the next indication, as we believe it has very little, if any, power to *arrest* inflammation of the air-passages. A single dose of two to five grains may be given as a cathartic at the outset, if for any particular reason it is indicated, as a stimulant to the liver; and from both its safety and certainty

of operation in children, it is generally judicious to administer it as above if any cathartic is required.

c. Emetics.—Much stress has been put upon the action of emetics in infantile laryngo-tracheitis; and all, as we believe, upon a false theory of their action. This particular point, however, will be considered under the second indication.

Inasmuch as laryngismus is often produced by irritating matter in the stomach, and when present in this disease, is doubtless increased by these causes, a mild emetic is never injurious, and is often very beneficial at its commencement. Indeed, in some cases of catarrh, very difficult at first to distinguish from this disease, an emetic will at once completely relieve the patient, and remove all anxiety as to the nature of the case.

Moreover, when given in the first stage of actual laryngo-tracheitis, an emetic may produce such a shock to the system as to put an end at once to the disease, by its mere "perturbating" effects. After the disease is fairly established, however, emetics, frequently repeated, are entirely out of place, as will be shown further on. While an emetic operation promises such an effect, or if the contents of the stomach are such as require to be removed, an emetic of ipecac. and tartrate of antimony, or, in asthenic cases, ipecac. and sulphate of zinc, may be used; it being understood that the emetic operation is not to be repeated unless positive indications subsequently arise.

When called to a doubtful case (like those of the second preceding paragraph*), we have generally given ʒ ss. to ʒ j. of the syrup, Scillæ Comp. (Hive Syrup), every fifteen minutes till free emesis is produced.

d. Expectorants are useful rather to fulfill the second and third indications, than for the arrest of inflammation. The tartrate of antimony, if given as already recommended, at the same time proves an efficient expectorant.

We shall specify certain expectorants, in the proper connexion, merely adding here, that they must not be given in the early stage, to the exclusion of the remedies which arrest the inflammatory process.

e. Counter-irritants are, moreover, not of any decided benefit, we believe, in the first stage of the disease; and they also interfere with the external local applications for the removal of inflammation, next to be mentioned.

After the heat of surface and the excitement of the circulation have somewhat subsided, and the application of cold is no longer beneficial, blisters and stimulating liniments may prove very beneficial in promoting the absorption of the exuded plasma; and they will, therefore, be again alluded to in another connection.

* See also p. 101, Aug. No., second paragraph.

f. Cold applied externally.—We consider this of the greatest value and importance. If cold applications are efficacious in all cases of external inflammation, they are scarcely less so here, where the inflamed surface is so nearly superficial. Cold must, however, be continuously applied, to produce the desired effect. Applied at intervals, indeed, it rather promotes than retards the inflammatory process; since, during the intervals, the temperature rises above the normal standard, in consequence of the reaction of the chill on the surface.

Cold water may be constantly dropped from a sponge upon a compress laid over the throat of the child; and the latter should be of only one or two thicknesses of linen, that evaporation may go on as rapidly as possible.

The application of hot water, early in the disease, as sometimes recommended, therefore appears to us objectionable; and that of rapid vesicants (aqua ammoniæ, &c.) still more unwarrantable.

g. Internal application to the seat of the inflammation.—First to be mentioned under this head is the solution of lunar caustic, applied by means of a syringe, or sponge-probang,* as recommended by Dr. Horace Green. We have used both instruments, and decidedly prefer the latter, as applicable in *all* cases of disease in which the solution is required; while the former is not so, in our judgment, though it answers well in many instances.

The solution most frequently used is that of 40 grains of the crystals of nit. silver, to 1 oz. of distilled water. This solution has a more sedative and less irritating effect upon the mucous surface than a weaker one, as of 10 or 20 grains to the ounce of water.

In our judgment, there is no local application for arresting the inflammatory process in this disease, to be at all compared with the solution just mentioned. It should be, at first, applied to the fauces and pharynx only; and then, in 15 to 30 minutes, the probang may be passed into the larynx, and through the rima glottidis if required. The operation should be repeated in some cases, three or four times daily, in others only once.† Other solutions, or fluids, thus applied, may also be found useful—such as glycerine, olive oil, &c.; but none will probably be found to possess the efficacy of the nitrate of silver. Applied to the pharynx and fauces, indeed, as soon

* The sponge must not exceed one-third to one-half inch in diameter, to pass through the rima glottidis of a child two years old, one-third inch being rather large at one year.

† Dr. H. Green has established the interesting fact, that much less irritation is produced by this operation in children with *croup*, than in adults with chronic laryngeal disease.

as the false membrane has appeared in these parts, it has frequently arrested the inflammatory process at once, and thus prevented its extension into the larynx and trachea. We should, therefore, feel it an unpardonable omission, at the present day, should we fail early to cauterize the pharynx (and the larynx and trachea, if already invaded by the disease), and to repeat the operation as circumstances might require in every case of laryngo-tracheitis. The objections sometimes raised, that this is a difficult operation, and also, if accomplished, a dangerous one—were always too puerile, and are now too generally known to be entirely unfounded, to require a refutation here.

The only other method of direct local application we shall mention, is by inhalation. The inhalation of aqueous vapor is especially to be commended, on account of its soothing effects upon the inflamed surface; and it is also a valuable remedy for diminishing the laryngismus accompanying true laryngo-tracheitis. Its efficacy in this respect may be also increased by the addition of camphor, or stramonium, and other narcotics.

I. Remedies to diminish the Laryngismus.

We have just mentioned aqueous vapor, with camphor or stramonium. Tartrate of antimony also diminishes it, while producing its general sedative action; and any appropriate emetic, even, may be given with a view to diminish it, if it appears to be mainly due to irritating matters in the stomach. Opiates, and especially laudanum, have also been recommended. We would advise them only to the extent to overcome any existing nervous irritation, cautiously avoiding any decided narcotic effect upon the respiration, in a disease in which diminished aëration of the blood is the principal cause of a fatal result. For a similar reason inhalations should be continued only for two or three minutes at a time, and frequently repeated, and the apartment kept thoroughly ventilated. We also recommend the hydrocyanic acid as both a valuable sedative and anti-spasmodic.

II. *Remedies to prevent the organization of the exudation into a false membrane.*

The means included under this head are:

1st. Those intended to *remove* the exudation at once,* viz. expectorants, emetics, and the sponge-probang.

2d. Remedies which diminish the *organizability* of the plasma: calomel and alkalies.

3d. Remedies promoting absorption of the exudation: counter-irritants.

a. Expectorants.—In adults the exuded plasma is usually removed at

* See August No. of Monthly, p. 95, third.

once, or after degenerating into pus, by the act of coughing and expectoration. In infants this result far more rarely occurs, since they do not expectorate by voluntary efforts. Any remedy, however, which will render more fluid and abundant the secretion upon the air passages, will so far aid in detaching the exuded plasma; and which will then be expelled by the simple act of coughing. Expectorants, therefore, are beneficial to this end, and may be administered to fulfill this indication. We will mention only the syrup and other forms of ipecac. seneca, and the squill. Alkalies become expectorant also, as will be seen under the next indication.

b. Emetics exert no marked effect in removing the plasma from the air passages, and hence are not to be commended. But this topic also will be considered at length, under the next indication.

c. The Sponge-probang. But the most certain method of directly removing the plasma, is the application to the surface, of this instrument. If merely moistened with water, it will very well accomplish this object. But since the solution of nitrate of silver (grs. xl. to ℥ j. water) before mentioned, acts on the exudation both to destroy its organizability and to detach it, while it at the same time arrests the inflammatory process, as has been shown, we always employ it. Indeed, we should not hesitate to make an opening into the trachea through which to apply the solution, in some cases, if it were otherwise impossible. But we shall recur to this again (p. 25).

2. We next consider the remedies administered to diminish the organizability of the exuded plasma.

a. The preparations of mercury, properly administered, possess the property just mentioned; but since the proto-chloride of mercury (calomel) is the one which manifests this property in the highest degree, and has been much vaunted by some in the treatment of infantile laryngo-tracheitis, we shall speak of it somewhat at length, believing that some remarks upon its precise effects in inflammation will aid in assigning to it its true value in the disease under consideration.

It has long been admitted that calomel is most useful in inflammations of *serous* membranes. *E. g.* in pleurisy, it is believed to promote the reabsorption of the exuded plasma, and thus to prevent the formation of adhesions and false membranes. It has, therefore, also been termed an "absorbefacient," or excitor of the absorbents.

We admit that calomel is most useful in inflammations of serous membranes, or rather in *all* inflammations where false membranes may be formed; also that it favors the absorption of the exuded plasma, and thus may prevent their formation; but, at the same time, it does not in any way increase the action of the absorbent vessels of the part affected; nor does it arrest the inflammatory process itself.

The whole effect of calomel in the diseases just mentioned, may be thus expressed: *it merely diminishes the organizability of the exuded plasma;* so that it is not so rapidly organized, and therefore a longer time is afforded for its re-absorption before organization takes place. This effect may now be regarded as established by experiment.

We are not cognizant of a single fact tending to show that calomel has any direct effect to arrest the inflammatory process itself; and therefore we have not given it any prominence in our list of remedies for that object (p. 198).

But in cases of inflammation of the alimentary canal (enteritis, colitis, &c.), calomel may exert a very decided *indirect* effect to arrest the inflammatory process itself. All the blood in the minute vessels of the mucous membrane of the alimentary canal, being collected by the vena portæ, and transmitted through the liver, any remedy which excites the action of the liver (i. e. acts as a *cholagogue*), promotes the circulation through the vena portæ, and they relieve congestion of the membrane itself. Thus calomel indirectly acts in enteritis and colitis to arrest the inflammatory process itself; while at the same time the flow of the bile, thus produced over the inflamed surface, also produces a positive soothing effect.

But it is only when calomel acts as a *cholagogue*, and therefore to some extent as a *cathartic*, that it arrests the inflammatory process even in the diseases just mentioned. To produce this effect it must be given also in doses (to an adult) of 5 to 15 grains. In laryngo-tracheitis, on the other hand, it has no such effect, in any dose, to arrest the inflammation; and so far, therefore, and in such doses, it is not indicated in this disease, except perhaps, in a single dose at the outset, as before explained (p. 198).

On the other hand, calomel administered in doses, frequently repeated, of $\frac{1}{2}$ grain to 2 grains (to adults), produces no cholagogue effect, but an entirely different one, from its gradual absorption, probably, into the blood, viz. a diminished power of organization in the blood plasma, as before stated. Whether this effect is produced by diminishing the fibrine, and therefore *weakening* (and thinning) the plasma, is not yet conclusively decided; though we regard this as the true explanation. Hence the value of calomel in small doses in all inflammations in which false membranes and adhesions are liable to occur, as pleurisy, endo-carditis, and the disease now under consideration.

While, therefore, we unqualifiedly condemn the custom of some, of giving large doses of this remedy (10 to even 20 grains) every three or four hours, in infantile laryngo-tracheitis, we may also perceive that small doses regularly repeated may prove of the utmost benefit. But we are to arrest the inflammation first, by the means before recommended, or at least employ them for a time, before we resort to this remedy.

After the first twenty-four or forty-eight hours, therefore, according to circumstances, it is desirable in a sthenic case, to commence with doses of calomel of $\frac{1}{4}$ to $\frac{3}{4}$ grain (for a child 9 to 12 months old), every four hours, or oftener; diminishing the quantity if any marked cholagogue effect is produced. This last effect is less liable to occur if $\frac{1}{4}$ to $\frac{1}{2}$ grain of the pulvis ipecacuanhæ comp. (Dover's powder) is added to each dose.

Yet calomel must be administered in this disease, even in the small doses just recommended, with great caution, and constant reference to the delicacy of the little patient. True, there is very little danger of ptyalism occurring before the age of five to seven years; and it has been pronounced impossible before the first dentition commences. But it is now pretty generally known that mercurial preparations (and especially calomel) are not well borne by scrofulous—and we will also add anæmic—subjects, whatever their ages or diseases. It produces great general debility; and if any accident exists requiring the aid of the reparative process, as an ulcer or a wound, it may indefinitely prevent this process from occurring, or even lead to phagadæna, or perhaps sloughing, in the part instead. The plasma always possessing a low grade of vitality (organizability) in such persons, becomes so far debilitated by the mercurial that reparation is impossible; and it is only on discontinuing it, and substituting tonics and proper diet, that the desired result ensues.

The fact just mentioned is here introduced for the sake of application in this connection, as well as for illustration. In scrofulous children the danger of organization of the plasma into a false membrane in true laryngo-tracheitis, is far less than in robust children, on account of its low vitality there; nor do they tolerate the calomel if given as just explained. To such children, therefore, it is better to give the pil. hydrargyri (if any mercurial), and to withhold calomel entirely. In every case of *asthenic* laryngo-tracheitis, the propriety of administering calomel must be thoroughly canvassed before it is decided to administer it. As a general principle, certainly, it should be administered only in the *sthenic* form of the disease.

Though we have so far prolonged our remarks upon calomel, we must also record our testimony in favor of one more preparation of mercury in this disease: the subsulphate, or Turpeth mineral.* It is a valuable substitute for calomel in less sthenic cases, in doses of $\frac{1}{4}$ to $\frac{3}{4}$ of a grain; and is to some extent an expectorant also.

b. Alkalies. It has been established by experiment that alkalies also, like calomel, diminish the organizability of the blood plasma. They are, however, much less efficient in this way; and for that very reason are appropriate in the asthenic form of the disease.

* The attention of the profession was first called to its use in this disease, we believe, by Dr. Hubbard, of Hallowell, Me.

Hence they become a very valuable substitute for mercurials, to prevent the organization of the exuded plasma, and should always be preferred when a milder remedy is believed to be sufficient. We have had more experience of the effects of the bicarbonate of soda in this disease; giving it in the dose of 3 to 5 grains every 4 hours, to a child one year old. Alkalies are well known to render less tenacious the viscid sputa of pneumonitis and acute bronchitis, and hence become valuable aids to expectoration in these diseases. Their power of rendering more fluid the fibrine mixed with the mucus in such sputa, accounts for this effect, and renders them also valuable as expectorants (see p. 10), as well as in preventing organization of the exuded plasma, in infantile laryngo-tracheitis.

As *alkaline stimulants*, the bicarbonate and the hydrochlorate of ammonia, are also valuable in the advanced stage of the disease, for sustaining the patient's strength, and promoting expectoration.

3. *Counter-irritants* may, lastly, be mentioned, as promoting absorption of the exudation, and thus preventing its organization. But, in regard to these, we merely refer back to page 199.

III. *Means for removing the false membrane when formed.*

These are *direct*, the probang; or *indirect*, as expectorants, counter-irritation, emetics, and tracheotomy.

a. The only direct method of removing the false membrane which need be mentioned, is the application of the solution of the nitrate of silver as already explained. We need not insist on the value of this application for the direct removal of the false membrane, at the present day, since cases have been recorded, in most of the principal medical journals, within the last two years, in which portions of the false membrane have been at once thus removed, and the patient evidently saved.* The sponge is to be carried into the trachea, and the operation repeated once in 2 to 24 hours according to the urgency of the case. With our appreciation of the value of this operation, we could not conscientiously omit it in the fulfillment of the indication now under consideration.

Expectorants and *counter-irritants* may still be continued, as under the preceding indication.

b. The use of emetics for removing the false membrane. Since emetics, frequently repeated, have almost uniformly been recommended for the purpose just mentioned, and much injury, in our opinion, results from this

* For cases, see Dr. Chapman's articles in the March and July Nos. of the New York Journal of Medicine, and Dr. Green's paper in the July No. of the Monthly.

practice, we shall attempt to show that it is founded on a false hypothesis, and is objectionable in all respects.

The foundation of the idea that the act of vomiting will expel a false membrane from the larynx or trachea, is the assumption that the acts of vomiting and of expiration from the lungs (including also coughing and expectoration) are, in their mechanism, almost identical. An account of the mechanism of both these actions will, however, demonstrate their entire dissimilarity, so far as their effects are concerned, and that an emetic cannot possibly exert any direct effect in the expulsion of a false membrane from the air passages.

Everybody knows that the object of the act of vomiting is the ejection upwards through the œsophagus into the buccal cavity, of the contents of the stomach; while that of coughing or expectoration (or forced expiration) is to expel into the same cavity, through the rima glottidis, the contents of the air passage below. If, therefore, mere emesis will produce the latter effect, we should expect that coughing, or expectoration, would evacuate the stomach, and that, therefore, we might administer an emetic or an expectorant, indifferently, to expel the false membrane. Admitting this, however, the remedy is not needed till the membrane is formed; and this occurs in only about one-sixth of all the cases. The indiscriminate use of *emetics* is, therefore, unjustifiable at all events and on any supposition. But we proceed to show that an emetic operation cannot possibly expel a false membrane from the air passages, on physiological grounds, except so far as it may do so by causing a violent concussion of all the contents of the thorax, or by some irregular and violent motions of the trachea—all of which indirect effects being also easily secured, as will appear, by far milder means.

The following account of the mechanism of the two actions in question, vomiting and forced expectoration, will explain the preceding remarks:

1. In *vomiting*, a full inspiration first occurs, which, disturbing the thorax, puts all the smaller expiratory muscles on the stretch, while the abdominal muscles are in a passive state, and the diaphragm is depressed and strongly contracted. Next, the rima glottidis is closed, and all the inspired air being thus retained in the air passages, all the muscles just mentioned are *fixed* in the positions indicated. Thirdly, a sudden contraction of the abdominal muscles occurs; and the stomach, being thus compressed between them and the previously depressed and fixed diaphragm, its contents are forced up through the œsophagus and pharynx, and the act of emesis is completed. Does the stomach also contract in aid of the abdominal muscles? It is very nearly, and generally *entirely*, passive in emesis. At least, vomiting has been made to occur, experimentally, in the lower ani-

mals, when a bladder, containing liquid and solid matter, was substituted in place of the stomach, after the latter had been removed.

Here, it will be seen, ejection of any substance from the air passages is impossible, since the glottis is completely closed, and the diaphragm continues depressed, and the thoracic muscles fixed—and of course the lungs cannot be *compressed*—till the first act of emesis is completed. Then follows another deep inspiration, and a second act of vomiting succeeds, as before explained.

2. In *coughing* or *expectoration*, a full inspiration also first occurs, as in the case of vomiting, and the expiratory muscles of the thorax, and the diaphragm become fixed, as in that case already explained. Secondly, the rima glottidis is suddenly opened, and the abdominal muscles instantly contract upon the stomach as before. But the diaphragm immediately relaxing, the stomach carries that muscle upwards against the base of the lungs; which being thus suddenly compressed, the contained air is violently forced up through the trachea and larynx, and thus any solid or fluid substances are expelled through the glottis into the buccal cavity, and the act of expectoration, or coughing, is completed.

Thus the first or preparatory movement to the acts both of vomiting and coughing, the full inspiration, is precisely the same; while the acts themselves have nothing in common, except the contraction of the abdominal muscles.

We have seen that the act of vomiting cannot possibly expel matters from the air passages, because the glottis is closed. A less perfect closure of the cardiac orifice of the stomach occurs, however, during the act of coughing; and, therefore, it sometimes happens that a violent paroxysm of coughing produces a partial evacuation of the stomach (or an act of emesis), at the same time. This is, indeed, very common in whooping-cough, and not very infrequent in phthisis; though frequently in the latter disease, the act of vomiting instantly *succeeds* that of coughing, being produced by the contact of the expectorated matter with the velum or pharynx, which are in a state of high irritation. Some irregular contractions of the diaphragm may also probably occur in this case, and the stomach thus become somewhat compressed in the act of coughing; while, normally, it is scarcely so at all. Vomiting not seldom accompanies the cough produced by the introduction of the caustic solutions upon the sponge-probang into the larynx and trachea, since thus a temporary spasmodic closure of the glottis is produced. We of course, distinguish between these cases and those where the caustic is applied only to the fauces or some part of the pharynx; the vomiting being directly due, in these instances, to the irritation of these parts.

But we will not pursue the subject farther. It is sufficient to have

shown that the act of vomiting does not, and cannot, directly, expel any substance from the air passage, through the glottis into the buccal cavity.

But if a quantity of solid contents be forced from the stomach through the œsophagus, must not the mass, from the anatomical relations of the canals, act on the trachea and its contents, while on its way through the other tube? Doubtless, it may produce motion of this tube to some extent —the latter being somewhat proportional to the amount and solidity of the matters ejected, and the force employed to eject them. But if any thing is to be gained in this violent and indirect manner, the same results may be secured by exciting attempts at vomiting (or retching) by titillation of the uvula, or the application of the sponge probang (with or without the caustic solution) low in the pharynx. In this way we might, at least, allow the patient to escape from the mischievous irritating and debilitating effects of the emetic upon the stomach itself; and which are all the more certain to ensue from the well-known difficulty in producing an emetic operation when infantile larnygo-tracheitis is somewhat advanced, and the consequent certainty, almost, that large doses, or violent remedies,* or both, will be administered.

Our reasons will, however, now be apparent for our decided condemnation of emetics frequently repeated in this disease, with a view to remove the false membrane. We consider an emetic proper only at the commencement of the attack, as already explained, and at such other times during the progress of the disease as they may be required, simply to evacuate the stomach,† and believe the practice we are condemning has destroyed many a patient who might have recovered in the absence of such prostrating and perturbating treatment.

Tracheotomy, as subservient to the removal of the false membrane.— Tracheotomy is regarded by those only who remember that death almost always soon follows it, when performed in infantile laryngo-tracheitis, as a most formidable operation. The surgeon, however, of experience, does not apprehend any great risk to his patient from this operation, if performed under ordinarily favorable circumstances; and he very seldom finds a fatal result essentially hastened by it. The truth is, that the operation is usually performed as a *last resort*, when the patient is so nearly moribund that no human agency can prolong life more than a few hours or minutes even—or when the most trifling operation might hasten the fatal issue. If we are ever to form a just appreciation of the value of this operation in the disease under consideration, we must perform it *seasonably*, while the patient still

* Sulphate of zinc and of copper are very generally recommended.

† A tea spoon full of alum, dissolved in four ounces of water, is a very certain emetic for a child two years old, provided the stomach needs to be evacuated in the advanced stage of this disease.

has strength to survive the operation, and also to respond to the new circumstances in which it places him. If the operation for hernia were always delayed till gangrene has ensued, it would be generally decried, and with just as good a reason, we submit, as tracheotomy now is.

We do not mean to say that tracheotomy should be performed, and seasonably, in every case of this disease, as the other operation should be in every case of irreducible strangulated hernia. But we mean to insist that tracheotomy shall be performed *seasonably, if at all*, and that thus alone can we ascertain its true value. We mean also to express our conviction that, thus performed, tracheotomy will be found a most valuable part of the treatment of infantile laryngo-tracheitis in many cases in which a false membrane has formed.*

We have implied that tracheotomy is not in itself a formidable operation; and yet, if a more safe and simple procedure than the one usually resorted to can be substituted, it were very desirable. Dr. Marshall Hall has a very simple method. But for the purposes now about to be considered we should prefer the operation recommended by Dr. Batchelder of New York.† He, indeed, proposes to substitute laryngotomy for tracheotomy, but extends his incision downwards through the cricoid cartilage, and also the first ring of the trachea, if required; thus rendering the operation, when required, a *laryngo-tracheotomy*. This operation he has himself seasonably performed some fifteen or twenty times, and has always found it to answer "perfectly well" the purpose for which the opening was made.

We conceive that the operation in question must have in view one or more of the following objects:

1. To prevent immediately fatal consequences from asphyxia, induced by laryngismus.

2. To afford an opening into the trachea, for the admission of air, larger than the rima glottidis, which is now partially filled by the false membrane.

3. To afford an opening through which applications may be made directly to the larnyx, trachea, and even to the bronchial tubes.

4. That the false membrane may be removed through the opening made.

The second and fourth objects only, imply that a false membrane is formed.

1. If we are present during a paroxysm of laryngismus, which we judge must prove fatal, of course the operation is to be performed without delay.

2. A recurrence to the pathology of this disease (August No., p. 98, 1 and 2) will show how little probability there is, after the first two or three days,

* Trousseau, who has probably operated more times, and with greater success, than any other person, operates earlier than is common with others.

† New York Journal of Medicine, January, 1854.

that the false membrane does not already extend into the trachea, at least, if not into the bronchi. If we operate with this end alone in view, therefore, we shall very probably be disappointed.

3. But we may make an opening for the sake of making applications through it to the larnyx, trachea, and bronchial tubes; and here an entirely new field opens to us. And we hope not to startle those overmuch who shudder at the idea both of the operation and of the probang now so frequently mentioned, if we say that in our opinion cases may occur in which it is justifiable to make an opening into the trachea for the mere purpose of applying the caustic solution and other remedies directly to the seat of the disease, and to the extent required.*

If, for instance, the case be a sthenic one, while from spasm or swelling of the larnyx, or some other cause, it is found impossible to pass the caustic solution through the rima glottidis, though it is very certain that a false membrane will be or has formed, and all of several children of the same family, attacked by the disease, have died of it, in this combination of circumstances, certainly we should feel justified in performing the operation for the object now under consideration.

4. Finally, we may operate in order to remove the false membrane through the opening, though the caustic may have been applied through the natural passages. For we may certainly act to greater advantage after the operation, if we have failed to remove the membrane before it. And now, as in the last case, we shall feel the necessity of applying the caustic solution, in order to *bring* away the membrane, and not wait for it to be discharged through the opening spontaneously.

These we conceive to be the legitimate objects of tracheotomy, when performed in infantile laryngo-tracheitis; and if restricted to the cases in which it is actually required, and seasonably performed, we believe it will prove a powerful means of diminishing the mortality from this disease. We must add, however, that the number of cases otherwise actually requiring it is greatly diminished by the internal application, through the natural passages, which has been so often recommended; and that but few cases in which this can be effectually made, will require the use of the scalpel.

IV. *Means for sustaining the patient's strength.*

If it be recollected that the false membrane formed in infantile laryngo-tracheitis is uniformly detached spontaneously, if the patient's life is sufficiently prolonged (Aug. No. p. 99, 3d), it will seem to be a matter of great importance to sustain the patient's strength, so far as possible, not only by the avoidance of all unnecessary medication, but also by direct means, so

* See page 202.

far as circumstances will allow. This inference has by no means been sufficiently recognized; as both the heroic treatment and the withdrawal of nourishing aliment, so generally adopted, abundantly prove.

We hardly need do more under this head, however, than to call attention to this subject, to make its importance apparent, and to induce the adoption of the means best calculated to secure the object in each particular case. In *asthenic* cases, it is a matter of the utmost importance to continue the use of broths, milk-porridge, wine whey, weak milk-punch, and the like, throughout the disease; to which tonics and stimulants are also to be added as the strength declines. In the treatment of *sthenic* cases, also, it must not be forgotten that infants are very soon prostrated by inanition, as well as by blood-letting and powerful emetics; and while we avoid the latter, we must also see to it that nutriment enough is taken.

We now give a tabular view of the treatment we have recommended for the two forms of this disease. Diphtherite, being regarded as an asthenic laryngo-tracheitis (p. 197, 10th), requires no special attention here.

	Sthenic Laryngo-tracheitis.	*Asthenic Laryngo-tracheitis.*
I. To arrest the inflammatory process, and control the laryngismus.	An emetic; followed by a full dose of calomel, if required.	Do. do.; or pil. hydrargyri, instead of calomel.
	Leeches to throat, or over the sternum; followed by cold applied continuously.	Leeches doubtful. Cold continuously applied.
	Tartrate of antimony; sedative doses, cautiously administered.	Nitrate of potassa.
	Internal application of solution of nitrate of silver.	Do. do.
	Inhalation of aqueous and narcotic vapors.	Do. do.
	Opiates, with caution. Hydrocyanic acid, do. do.	Do. do.
II. To prevent organization of the exuded plasma.	Sponge-probang and caustic solution.	Do. do.
	Expectorants.	Stimulating expectorants.
	Calomel, in small doses.	Turpeth mineral.
	Alkalies.	Do.
	Counter-irritation.	Do.
	Tracheotomy ?	
III. For removing the false membrane when formed.	Continue caustic solution.	Do. do.
	do expectorants.	Do.
	do counter-irritation.	Do.
	do alkalies.	Stimulant alkalies.
	No emetics, or calomel.	Do. do.
	Tracheotomy, *seasonably*, if at all.	Do. do.
IV. To sustain the strength.	Milk-porridge, arrow-root, broth, &c.	Do. do.; also wine whey, milk punch, &c.
	Tonics, if required.	Tonics and stimulants.

Thus we have given expression to our views of the pathology of infantile laryngo-tracheitis, or croup, and of the treatment rationally based upon those views. If, in attempting to simplify the pathology of a subject so very differently understood by different writers, we have committed the error in the opposite direction, of including under the same term pathological conditions which are really, for any practical purpose, different, we heartily regret it. But we can hardly doubt that the attempt will be regarded as having been made in the right direction; and we will be happy to acknowledge our error, when it is shown that our views are inconsistent with the present state of pathological science.

In respect to *treatment*, we have not sought to add new modes—believing the list of remedies already too ample—but rather to appreciate the precise value of the remedies sanctioned by long experience, and above all, to inculcate that caution in the use of them all, which the tender age and the delicacy of the patient demand, and which has too generally been almost entirely forgotten, we think, in the treatment of this disease.

In conclusion, we may add, that the adoption, in practice, for several years, of the principles proposed in the preceding pages, has confirmed their correctness in our estimation; and we might have given cases of our own in illustration, were it not that we should thus have extended this paper beyond the limits we had proposed, and at the same time, perhaps, have somewhat interfered with its logical construction.

Dartmouth College, Aug. 1, 1854.

PART II.—REVIEWS AND BIBLIOGRAPHY.

1. *A Clinical Introduction to the Practice of Auscultation, and other modes of Physical Diagnosis in the Lungs and Heart.* By H. M. HUGHES, M. D., M. R. C. P., Assistant Physician to Guy's Hospital, etc.: 12mo. pp. 304. Second American from the second and revised English edition. Blanchard & Lea, Philadelphia, 1854, from John Wiley, New York.

2. *Auscultation and Percussion.* By DR. JOSEPH SKODA. Translated, from the fourth edition, by W. O. Markham, M. D., Assistant Physician to St. Mary's Hospital, London; 12mo. pp. 380. Lindsay & Blakiston, Philadelphia, 1854.

SINCE the publication of the celebrated work of Lænnec, many treatises have appeared on the subject which forms the matter of the books now under consideration. The stethoscope, as an instrument for facilitating a correct diagnosis of the important classes of disease to which the respira-

tory and circulating systems are liable, has been subjected to a most thorough investigation and strict practical study. Many modifications of its form, and sundry changes in the material used in its manufacture, have been suggested and tried; but the principle of its construction remains the same, experience proving that the more simple the contrivance and uniform the substance employed, the more complete and useful the instrument. Its application has also been extended to other purposes than that for which it was originally designed and proposed, for which, in well practised hands and to thoroughly educated ears, it has proved eminently useful. Some of these may be enumerated in illustration. The determination of the vitality of the fœtus in utero, of its relative position, and of the existence of twins, etc.; the detection of the fluid character, or otherwise, of the contents of tumors or enlargements: *e. g.* in aneurism, abscess, hernia, tympanitis, etc.; the recognition of crepitus in fractures, bursal noises, etc. It thus appears that its utility extends into several departments of medical and surgical science.

For some time after its introduction to the profession, it became most fashionable, and every practitioner was, or at least imagined himself to be, a finished stethoscopist. No diagnosis was ever ventured upon without an appeal to it, and many and most serious were the mistakes committed under the supposed accuracy of its revelations. After a season of great popularity, its reputation began to decline. The older men sensibly enough declared that they had no experience of its use; that it was too late in the day for them to learn the various sounds indicated by it; that it was a tedious and troublesome mode of investigating diseases which they could recognize by a glance, or diagnosticate as correctly by other symptoms. The learner found that it was equally tiresome to acquire a correct knowledge of the respective normal and abnormal sounds, that it required more time to carry on a faithful examination of an individual case, than he could spare from the numerous other calls upon his attention. Both these classes of investigators, profiting by the discovery that mistakes had been committed, at once irrationally condemned the instrument and declared its value to be overrated. Others there are who profess to be able to auscultate more satisfactorily with the ear, the *immediate auscultation* of most writers, than by the intervention of any acoustic apparatus, however simple. This may be very well to say; but all who are *practised* in the use of the instrument, must admit its great utility in defining the more obscure and complicated sounds, as well as its quality of increasing their tone, and its convenience to the practitioner and the patient, in some cases being indispensable from the peculiar attending circumstances. The patient, painstaking, and zealous among the profession, however, those particularly who made a

specialty of this method of diagnosis, have learned to place a true value upon its use and indications.

The assistance derived from percussion in forming a correct judgment, and in corroborating the stethoscopic signs, has been long understood and acknowledged, and their combination in practice fortifies many a physician in prescribing for a malady, or in uttering a prognosis. Nor is this the extent of the valuable nature of physical diagnosis. Physiology owes not a little of its present extensive stock of facts and theories to the faithful labors of the earnest diagnostician. The science of life-assurance, founded as it is on the doctrine of probabilities, is mainly indebted, for the successful issue of its practical application, to the knowledge derived from auscultation.

It cannot be denied that, in the study and practice of stethoscopsy there is much to discourage the student and practitioner not mentally and physically endowed for its just appreciation and perfect acquisition. It is essential that a correct knowledge of, and familiarity with, the normal sounds in the healthy body should be acquired, and of these, under the modifying circumstances of age, sex, temperament, configuration, habits, atmospheric influences, mental emotions, position, time of examination, nature and extent of transmitting media, and a careful comparison of both sides in the case of duality of the organs examined.* To conduct carefully and successfully such investigations, there will be requisite, firmness, patience, memory, concentration of the attention, and a well attuned ear, susceptible of the finest modulation of tone, rhythm, and time. And when it is remembered that in the several regions of the thorax, in the normal state, there are eleven constant and some occasional sounds to be heard, we shall be able to appreciate the nature and extent of difficulties which are to be encountered in acquiring a competent knowledge of them; more especially will the difficulty be enhanced where the multiplication of this number by disease, and the modification of the character of each by the condition of the patient, the duration of the disease, and the pathological changes attending it, are to be considered and investigated.

We can account also for very much of the prejudice existing against auscultation in the minds of many Anglo-Saxon students and practitioners in former days, and not a few even at the present day, from the circumstance of the nomenclature employed in definition, even by writers in their own language, being retained in French, as originally given to the profes-

* On this point Skoda further tells us, "The percussion sound and the resistance vary much in the different regions of the thorax and abdomen, when the subjacent organs are in a normal condition. The percussion sound also varies in different individuals over corresponding parts; and the same is true of the phenomena of auscultation." p. 285.

sion by Lænnec. Thanks to improved educational requirements, and the enlightenment which a freer intercourse between the respective nations has produced, this difficulty has been, to a great extent, removed. It must not be supposed, however, that we think either the original terms of definition perfect, or that the absence of complemental phrases in our own tongue is not very much to be regretted; for in the interpretation which each individual reader may put upon a word, or given form of words, in a foreign language, will depend the value or character he attaches to the phenomenon or circumstance described and indicated; and to him who is ignorant of the language employed, such definitions are worse than useless. Hence the necessity of a current medium of definitive terms in each language, in every department of philosophical and scientific study. This necessity for clear and positive terms, particularly in abstract sciences is well illustrated by the controversial difficulties which have heretofore arisen, and are still frequently springing up in ethics and theology. In both of the books before us we are rejoiced to find the attempt to remove this obstacle to a more intimate acquaintance with the phenomena of auscultation, by the employment of vernacular terms of explanation, Dr. Markham's translation of Skoda's phraseology is happy in this particular.*

Dr. Hughes's work is an excellent manual for the student. His language is forcible, and his style colloquial; it is written, in fact, much as he would speak while teaching, and is hence, perhaps, not inaptly termed a clinical introduction to the practice. Skoda's work, on the other hand, is a more elaborate one; it labors under the disadvantage of being a translated work, in which, however faithfully accomplished, must still remain those idiomatic peculiarities derivable from the original. We will do the translator the justice to say that he has obviated many of these with great ability and success.

These writers are opposed in their views on several points—a circumstance thus frankly and candidly alluded to by Dr. Hughes in his preface: "Lest it should be supposed that I have unfairly neglected the consideration of the opinions of Skoda, I may state that I have been long acquainted with his views; that I have, recently, carefully examined them, as partially enunciated in the lectures of Dr. Herbert Davies, and more generally propounded in the translation of Dr. Markham. But, as I believe those views (when differing from his contemporaries, and more especially in the very general application of the *laws of consonance* to the chest) to be in many, perhaps in most, respects incorrect, I have not thought it desirable to introduce any

* Dr. Markham says, "Dr. Latham is the first English author, so far as I am aware, who has endeavored to throw a little Saxon simplicity into the study of auscultation, and to divest it of some of its Gallic exuberances."

particular notice of them, fearing that it might add to the perplexity rather than to the instruction, of the student."

Dr. Hughes gives us six chapters. In the first he enters fully into the necessary qualifications of the student of auscultation, suggests some wholesome cautions as to the conduct and demeanor of the examiner, in the course of which the following admirable rule is emphatically laid down: "*In all examinations, the benefit of the person examined should be the primary consideration.*" After recommending a proper position for the patient, enumerating the divisions of the chest into several regions, he takes up the consideration of the different modes of exploration in diseases of the chest, each of which forms the leading heading of the subsequent chapters, thus:—Inspection, or Ocular Examination; Palpation, or Manual Examination; Percussion, or Examination by Striking; under this heading is included a description of the phenomena elicited in the healthy and diseased conditions; Auscultation, or Examination by the Ear; Immediate and Mediate Auscultation. Here we have a detail of the normal and abnormal sounds in the lungs, heart, and larger vessels—a description of the Stethoscope, etc.

Mensuration or Examination by admeasurement, and Succussion.

As a manual, we can cordially recommend this volume to the student. It will, at least, teach how to set about learning what he ought to know, and what, we have no doubt, he desires to acquire. As to the philosophy of Dr. Hughes's views, he will be better able to appreciate that when he shall have acquired a practical acquaintance with the subject and a greater familiarity with the literature of the subject.

Dr. Skoda's book affords more matter for reflection to the practitioner, and to the student who has already acquired a competent knowledge of the subject. It is a bold and original work, and written with the care and deep thought so characteristic of his countrymen, but is at the same time devoid of excess in theoretical opinions. His style and mode of reasoning are somewhat obscure, but on the whole the reader rises from its perusal with a strong desire to go through it a second time. Dr. Markham tells us, in his preface to the work, that "the critical manner in which Dr. Skoda's theory of the cause of the Bronchophonic voice has been brought before the profession, has certainly not much aided in its propagation." We will not be led into this error, inasmuch as we really have not yet seen any explanation of the phenomenon which appeared to us, *prima facie*, to be more reasonable and logical.

This doctrine of consonance is one the discussion of which will awaken a train of reflection and reasoning, independently of the doctrines of Lænnec, to which it is entirely opposed, which must be productive of great

benefit to science, whatever may be the result in as far as the proposition itself is concerned.

It is impossible, in the narrow compass to which we are necessarily restricted in this periodical, to enter into a very lengthened or detailed consideration of such an elaborate work as the one before us: small as it is, it contains a large fund of invaluable facts; and if we only exercise an ordinary discretionary prudence, we may soon distinguish the mere theoretical parts from those which are essentially practical. The profession owes much to Dr. Markham for his admirable translation, and also for the complete résumé of Skoda's particular views contained in the preface of the work, by which the reader becomes forewarned against what may be thought by some to be heterodoxy. ‡

Ueber Staar und Staaroperationen, nebst andern Beobachtungen und Erfahrungen aus seines Vaters, Dr. Fried. Jæger, *K. K. Prof., und aus der eigenen ophthalmologischen Praxis von* Eduard Jæger, Dr. Med. Chir. Mag. der Augenheilkunde Geb. Docenten der Augenheilkunde an der Vien Universität; Mitgl. der Med. Facultat der K. K. Gesellschaft der Aerzte zu Vien, mit 10 lith. Tafeln. L. W. Seidl. Vienna, 1854.

(*On Cataract and Operations for Cataract, with the observations and results of the ophthalmic practice of his father,* Prof. Frederick Jæger, *and his own,* by Edward Jæger, M. D., &c.)

The compiled observations of a long standing practice gain in value if made on a scientific base, and must be the more welcome the higher the authority from which they come. Every contribution made in a scientific point of view must be favorably received, as comparatively but a few medical men engaged in extensive practice have time to devote themselves to the publication of their experience in a manner that will be useful to practice and theory. Generally, the descriptions are made in a way that proves the possibility of a success if imitated, but does not vouch for it, as empirical facts are gathered together which, even if affording opportunity for speculations on these, are still too little convincing to be reliable. On the other hand, from single facts theories are deduced which go far beyond the mark aimed at by them. But seldom one meets an adequate distribution of facts, and correct theoretical views derived from them.

The little volume before us answers this purpose admirably; it realizes the expectations everybody familiar with the name of Jæger naturally entertains.

Cataract and its operations are first considered. Jæger attributes the most frequent cause of the formation of cataract to a morbid change in the process of nutrition of the crystalline lens, in which the crystalline fibre

divides in a molecular mass, setting free a fatty substance which is no longer serviceable for the purpose of transmission of rays of light; various operations and cases are then briefly mentioned. New instruments, and chiefly eye specula, are dwelt upon and fairly explained. The examination of the faculty of vision in sound individuals and patients, concludes this interesting publication. Want of space prevents us from enlarging upon its contents, but the following tables will show the value of it, and do not require any comment:

Synopsis of all Patients Attended and Operations Performed.

Year.	Number of Patients.	Internal.	Eye Patients.	Sum of operations.
1849	2,475	367	2,108	204
1850	3,509	441	3,068	243
1851	2,988	355	2,633	243
1852	3,291	391	2,900	271
	12,263	1,554	10,709	961

The different modes for operating used in the four years give the following result:

In the operation for Discission, one completely unfavorable case in nine operations. Eleven per cent.

In the operation for Reclination, one completely unfavorable case in ten operations. Ten per cent.

In the operation for extraction one completely unfavorable case in sixteen operations. Six and a quarter per cent.

In the operation of Partial Extraction one completely unfavorable case in twenty-five operations. Four per cent.

The streaked scale (strichscale), introduced by Edward Jæger for the purpose of testing the faculty of vision, consists of a scale of black lines on white ground, diminishing in a certain proportion in size and relative distance. According to Professer Stampfer, of Vienna, who originally devised this scale for the purpose of testing telescopes, an eye which perceives eighty lines of the scale, or rather the distance between the two lines, is to be considered a good one; very good ones distinguish three to five lines further; the maximum is six to seven lines, above the border of this scale, which is to be held in the hand of the patient or individual to be examined at equal height with his eyes at a certain distance. We tested the efficacy of this scale, chiefly for determining approximately the improvement in, or the decrease of, the accommodation of sight in different eye-diseases.

The book under consideration gives credit to the father and does honor to the son. Although the spirit of the father pervades the whole, the original additions of the son give it the stamp of modern speculative ophthalmic surgery. A perusal of it will well repay the reader. G.

A Universal Formulary; containing the methods of preparing and administering officinal and other medicines. The whole adapted to physicians and pharmaceutists. By R. EGLESFELD GRIFFITH, M. D.; a new edition, carefully revised and much extended, by R. P. THOMAS, M. D. Philadelphia: Blanchard & Lea. From O. A. Roorbach. pp. 650.

A formulary is not a very attractive book, neither is it one which should be read continuously; and still, when well arranged, it is very useful. So many valuable suggestions are obtained by the study of approved formulæ that, though they are not followed exactly, a beneficial effect is produced on the method of prescribing: to those who are obliged to act as their own pharmaceutists, precise directions for manipulating are a great convenience. Not only are the usual medical formulæ contained in this book, but dietetic preparations are given somewhat fully, with directions for making anatomical and preservative injections, while we observe many other compounds are described which have no particular connection with medicine. The book is a good one, in our opinion; and as such we recommend it to the profession.

The Half-Yearly Abstract of the Medical Sciences; being a practical and analytical digest of the contents of the principal British and continental medical works published in the preceding six months; together with a series of critical reports on the progress of medicine and the collateral sciences during the same period. Edited by W. H. RANKING, M. D., &c., and C. B. RADCLIFF, M. D., &c. Volume 19, January to June, 1854. London: John Churchill.

Reprint of the same. Philadelphia: Lindsay & Blakiston.

"Ranking's Abstract" is no doubt familiar to all our readers, or if not, the full title quoted above gives a very good idea of its purpose and plan. The very fact of its being a *digest* forbids an analysis of its contents, and we cannot do more or less than to say that the number is a very valuable one, quite as much so as any of the preceding. Of these editions, the London is superior to the republication, being better printed, on better paper, and bound in cloth. Its price is of course greater; but whoever values his eyesight and wishes for comfort in reading a book, would willingly pay the difference. Still, in these days of cheap literature, the contents being the same, the republication will doubtless meet with the greatest sale.

PART III.—CHRONICLE OF MEDICAL PROGRESS.

[The abstracts and translations found under this title are made expressly for the AMERICAN MEDICAL MONTHLY.]

On Crystallization of the Blood.—By DR. W. BERLIN.

THE author states, that before Funke and Kölliker, Donders had found crystals in blood from the intestinal canal of leeches, which had drawn some days before, and that he still preserves the preparations of them. The author also chose this method of investigating blood-crystallization, and took especial care that water did not come in contact with the blood in the intestine of the animals. In the intestine of the leech, blood gradually forms a tough, sticky mass, and assumes a brown-red color. In this case, the elements having form cling together, so that, without reägents, none of them can be distinguished, except the colorless blood-corpuscles, which also after a certain time become granular and disappear. Blood thus colored adheres to the glass, the blood-corpuscles still moving about or set in motion by reägents, have already lost much of their original color; that is, their contents have already, in greater part, escaped into the cellular substance. After six or seven days, the first crystals usually, but not always, show themselves in the blood; the number of them then continues to increase. The crystals, identical with the blood-crystals of authors, have a brown-red color, increasing with their length and thickness. Very small ones, which mostly represent four-sided columellæ, are so little colored, that one would almost take them to be colorless.

The majority of the crystals are long, somewhat broad columns and columellæ, with two broad and two narrow sides. Length, height, and breadth, vary to an uncommon degree; we find, therefore, in part, long, narrow, thin columellæ, in part tables, even forms like obliquely displaced cubes. The columellæ are not always right-angled; the principal axis also stands somewhat oblique. The corners in all these forms, as in the cholesterine crystals, are found defective. Funke refers the crystals either to the rhombic or to the monoklinohedric system; but many belong also to the monoklinic, or klinohedric. Frequently, also, the crystals, sometimes the large ones, appear as if they had foramina. Perhaps these apparent openings are nothing more than blood-cells decolored, robbed of their contents.

The crystals are very perishable, but the older crystals appear to be able to oppose greater resistance to the influence of air and fluids. Therefore, the investigation is best undertaken in leeches which have already drawn five weeks, or more, previous.

The medium in which the crystals lie, under the microscope, is by no

means uncolored; but the color is less in intensity than that of the crystals, and is mostly violet. The border of the viscid preparation dries in the air too quickly. The air, or its oxygen, quickly changes the color of this part into red, and, in consequence, the form of the same does not remain wholly unchanged. Hence the statement of Lehmann is, in some measure, explained, that the crystals become, under water, violet, or even reddish, more rarely, colorless. A second difficulty in the investigation arises from the consistence of the blood, on account of which the fluid applied as a reägent can seldom penetrate the whole mass.

The question to be determined now, was this: Do the crystals in the blood consist of materials which are already proper to the blood, and are they of the organic or inorganic principles of the blood? Of the inorganic, those insoluble in water (carbonate of lime, carbonate of magnesia, phosphate of lime, phosphate of magnesia) are excluded, partly on account of want of effervescence with acids, partly by direct investigation made upon them; consequently, only those salts soluble in water, are to be taken into consideration. When leech blood was dried between two glass plates, and the evaporation thereby favored, crystals were formed which were not yet present in the intestine of the animal. These crystals, however, are not so regular and durable as those which form in the leech, with slower diminution of the water. If removal of the water favors the crystallization, so it is very naturally found, that, through the addition of water, the crystals disappear. This disappearance of the crystals in water, the author considers by no means a real solution, because motion of the glass plates, and other mechanical influences, so easily destroy the crystals; and, then, because the crystals are not again regenerated after the water is evaporated. Therefore is it also not incomprehensible, that Kölliker's crystals were not dissolved in water. This is simply to be ascribed to the form, and the peculiar circumstances, but not to the material.

The crystals, therefore, must contain an organic or a mixed principle. Albumen, fibrine, fat, occur in the intercellular substance of the blood. Fat is soluble in alcohol and ether; not so the blood-crystals. But these, again, cannot consist of albumen or fibrine (colored by hæmatine), as the following reactions show:

1. Concentrated carbonate of soda dissolves the crystals, with a high red color, playing into orange; the form of the crystals is partially, yet indistinctly, to be recognised; the blood-corpuscles, which become visible, are colored brown-yellow. At other times, and with older crystals, the violet-red passes through deep-red to green; at the borders of the preparation the green parts become already again darker; some crystals are yet indistinctly recognised as red points. With a dilute solution of soda the crystals become, at the border of the preparation, brown-yellow, but others

deep-red, and they lose their regular contour. In these reactions the author recognises those again, which Virchow obtained from his hæmotoidine crystals, and the preceding pigment forms. Lehmann, also, saw the clear red color pass into dirty yellow, from the effect of caustic potash.

2. Ammonium dissolves the crystals with a peach-blossom color; they become shapeless. This, also, corresponds perfectly with Lehmann's results.

3. By nitric acid the color becomes a clear yellow-brown, then black, brown-black, chestnut brown, finally, dirty dark green. Lehmann also saw the crystals become dark, even black, by cold concentrated nitric acid.

4. Sulphuric acid dissolves the crystals, piece by piece, with a brown color, yet so that after some time the form of the crystals, especially of the greater, appears again as a flat spot, and then, later, becomes indistinct.

5. Nitric acid produces the same effect; but red and green precede the dirty brown.

6. Concentrated acetic acid dissolves the crystals peach-blossom red, which later passes to yellow-brown. At other times the crystals become thereby clear yellow, and are seen with difficulty.

7. Arsenious acid is especially appropriate to isolate the blood-cells, and to bring their alterations to view. The crystals remain a clear violet-red. If the preparation is moved, then the crystals disappear, as through water.

From these reactions, the author concludes, that the crystals are neither albumen nor fibrine (that crystals could also be obtained frem defibrinated blood, Kunde already found), and considers their substance as hæmatine, whilst he asserts, in view of the large quantity (7 per cent.) in which Lehmann found them in the blood, that we have not yet learned to separate the hæmatine completely from the blood. Alcohol, containing sulphuric acid, or ammonia, will also quickly dissolve the crystals. The earlier exhibited hæmatine may be, surely, a different body from the crystal substance, it containing more iron; but hæmatine does not occur as such in the blood-corpuscles, and the crystal substance would be much more properly designated by this name. If, now, hæmatine is contained in the crystals, the latter cannot be a product of decomposition. It is supposable, on the other hand, that they consist of a combination of an organic and an inorganic material.

The authors who named the blood-crystals hæmato-globuline, have not yet proved that these consist of the two substances implied by the name. The author's view approximates that of Kölliker, who maintains a relationship of the crystals with hæmatine and hæmatoidine, only the author claims still more than mere relationship.

The form of the crystals, their manner of origin, and their reactions,

proclaim a conformity with hæmatoidine, not merely a relationship. The form is almost the same[?]. The size of the artificial and the pathological crystals may differ very much; but this is not conclusive against their identity, since, also, the size of the crystals in extravasations is subject to great differences. Differences of reaction occur as well with the different hæmatoidine crystals, as they were not long since said to do with the different hæmatine crystals. We must, therefore, needs admit the identity of hæmatine and hæmatoidine [?].

The author asks, farther, whether the perishableness of the blood-corpuscles has any connection with the origin of the crystals. The phenomena of the formation of crystals express the contrary; those do not exclude the presence of blood-corpuscles, and they become visible upon the addition of a little arsenious acid. The blood-corpuscles evidently diminish in circumference as their contents escape. Blood which after some weeks is pressed out of the anus of leeches, still contains blood-corpuscles. The escape of the contents, and the destruction of the cell-membrane, are, therefore, independent of one another; we must therefore consider the first as a physiological process.

In the formation of bile in the liver, the destruction of the membrane of the blood-corpuscle is a yet unproven hypothesis. The same is true of the hæmatoidine crystals in extravasations. According to the author, the proof is wanting of a destruction of the blood-corpuscles, which previously contained the now crystallized material. There is, at the basis of this, a perverted generalizing of the coloring matter of the blood with the red blood-corpuscles. Thus they speak of diminution of the red blood-corpuscles in the chlorotic, meaning only diminution of the hæmatine. Those blood-cells whose contents are less, or almost not at all colored red, belong, notwithstanding, to those which we are accustomed to designate as red blood-corpuscles.

In connection with this subject, stands also the question concerning the cells containing blood-corpuscles, of the occurrence of which the author, like Donders, could not satisfy himself. The author thinks that the corpuscles and these cells may be frequently nothing else but hæmatoidine or hæmatine crystals.—*Schmidt's Jahrbücher, June*, 1854.

On the Doctrine of the Secretion-cell.—By H. Luschka.

It has not been hitherto admitted that any special means was provided for the formation of the cerebro-spinal fluid, of the fluidity of the pleura, of the pericardium, of the peritoneum, or for the production of the aqueous

humor, but that these principles arose from simple exudation of the fluids of the blood through the vascular walls. The physical and chemical differences of these fluids from the liquor sanguinis have, as has been hitherto supposed, their origin in the degree of penetrability of the capillary walls, in the rapidity of the motion of the blood in them, in the physical and chemical property of the blood itself streaming through the capillaries. But, together with many other doubts which this supposed method of formation calls forth, the point is especially difficult to explain why the measure of the formation of these fluids in the normal condition is so limited while nothing stands in the way of a farther transudation; wherefore, for example, the vessels of the pericardium, of the pleura, &c., do not regularly deposit as much as can generally have room in these cavities according to the measure of the distensibility of their walls. It is much more probable, *a priori*, that in the formation of the so-called normal transudations, a law is in operation based on the metamorphosis of special formal elements, which not only governs the quality, but also the quantity estimated for a definite time.

We can best recognise the first formation of the formal elements generally and the development of the secretion-cells in particular, in the glands for the secretion of the gastric juice in animals just killed. These glands represent here principally simple utricles provided with dilated, knob-form dependences; the inner surface of the structureless basement membrane is lined with a cylinder epithelium; the half turned towards the base of the utricle is the laboratory of the stomach-cell formation (Labzellenbildung). Here is found as the lowest, even the first formation (protoplasm) proceeding from the homogeneous blastema, an extremely fine, granular molecular mass. Together with the elementary granules are exhibited larger, sparsely granulated corpuscles, measuring 0.006 of a millimeter in diameter, roundish, or perfectly round nuclei. As in the plastic exudation, so also in the contents of the gastric glands, the protoplasm is frequently arranged in little masses or flocks, in which lie, at various distances, roundish corpuscles with an abrupt and dark contour, the nuclei of the future cells. In these little masses and flocks arises a sort of furrowing process, by which the fine granular substance is separated into roundish portions, which surround the nuclei in the beginning as a tender, loose substance, but later, whilst the bodies thus formed become luxuriant, increase to a thicker and denser cortical substance with defined limits. These are, in the beginning, not yet enclosed by structureless envelops as cell-membranes; some time after the deposition of the proto-plasmic mass about the nucleus, a formal and chemical separation first occurs. Whilst the outermost layer mollifies to a structureless membrane, the rest of the mass, consisting of the nucleus and a variously altered molecular substance, becomes enclosed by this as a

content. The cell thus formed now becomes an organ of secretion. From the molecular mass and from the nucleus, under a gradual homogenesic and fluidifying process, arise the constituents peculiar to the secretion, which lastly become free by the bursting or dissolution of the cell-envelope. The cell becomes thereby larger, transparent, clear as water, having a very delicate contour. As the fluidification gradually progresses from the periphery to the centre, so the nucleus is generally the last constituent fluidified.

The cerebro-spinal fluid is formed by a similar process. The so-called *ependyma ventriculorum*, for example, does not stand in connection with the arachnoidea, but represents an independent formation. Upon examination of the ependyma, we find firstly an extremely delicate fibrous layer, composed merely of fibrillæ of cellular tissue, lying thickly upon the medullary substance of the brain; upon it lies a homogeneous, perfectly transparent lamella consisting of structureless cellular substance, which at the same time is the seat of a simple layer of a plate-epithelium. In the normal condition are found, in this extremely thin layer of cellular substance, separable from the medulla only by maceration, very few capillary vessels which therefore can only secrete the nutritive fluid, and not also the cerebro-spinal liquor. The source of the latter fluid is very different. In the cerebral ventricles lie the choroid plexus, structures peculiarly arranged and remarkable for their great vascular richness. Upon the surface of these we see, beneath the microscope, numberless papillar or fringe-like eminences scarcely $\frac{1}{12}$ of a millimetre in height. These eminences convey fine terminal blood-vessels in all imaginable combinations of tortuosity, which, like the coarser vessels, lie in a superstructure consisting partly of bundle-form, partly of homogeneous cellular substance. The surface of the tuft of capillary vessels exhibits a manifold epithelium intricately laminated, which is so massive, specially at those fringe-like prolongations, that it mounts far above the vessels and the fundamental layer of cellular tissue. This massiveness is so much the more striking, as the epithelial layer of the ventricular walls is single; therefore, also, as well as on account of the layer protected in and for itself, this epithelial layer will not have the importance of a protective means.

The epithelium of the choroid plexus of mammalia and birds just killed, consists in its deepest layers of a very fine, granular, molecular mass and numerous roundish, delicately granulated nuclei, the superior strata consist predominantly of partly polygonal, partly roundish cells, which without exception possess a nucleus, and are more or less granulated. The uppermost layer lining the free surface of the choroid plexus, contains variously appearing constituents, but which may be recognized merely as successions of the finely granulated epithelial plate containing nuclei. Together with the plates are also found, in all possible transitions, sparsely granulated spherical

bodies, always with a nucleus; spherical, shining cells with a very delicate contour, containing a nucleus, but otherwise homogeneous; little vesicles, which no longer contain any corporeal element, by far the most have become larger and of a vitreous transparency, with an extremely delicate, structureless wall. Such pellucid cells we often see projecting far beyond the border of the object, and scarcely raised; they are frequently so transparent, their contour so delicate, that they can be recognized only by a proper illumination. Not seldom we observe how such a vesicle distends and finally bursts or dissolves; how from it issue smaller and larger, clear drops, like fluid albumen, which gradually mingle with the water applied to the object; how the cell thereby leaves behind no remnants, that is, is perfectly dissolved, or leaves remaining only a very fine membranous coagulum. The liquefaction, or breaking up of these cells proceeds very rapidly; we find, therefore, a longer time after death and in the corpses of men, no trace of this process. By no means are all the cells of the choroid plexus employed in the formation of the cerebro-spinal fluid through the metamorphosis just indicated, but many become the laboratories of fat. Perhaps the fat first occurs in the cells robbed of their normal contents, since it does not follow the destruction of the envelopes. The action appears to be similar to that in the hepatic cells of adults, of which a certain number are very regularly accustomed to be the depositories of free fat.

The fluid of the pleura, of the peritoneum, of the pericardium, is normally during life so extraordinarily small that it just suffices to keep the surfaces moist, smooth, and shining. The serous fluid also in these sacks proceeds from cells of the epithelial lining. Together with the epithelial plates are found cells which sometimes even without the addition of water, sometimes first after this, are roundish transparent, soft, deliquescent, whilst plates, lying immediately by the side of them, exhibit none of these properties. Such are the cells which by their deliquescence preserve the free surface of these serous membranes moist and shining. The deliquescency of these cells makes it explicable why we so frequently find places in serous membranes, which are destitute of an epithelium,—even because the secretion cells which collect there have been broken up, whilst their places are not yet supplied; this is also the reason that we find the fully developed cells only in animals just killed, but in human corpses, only the earlier stages of development. Most of the secretion cells of the membranes in question proceed from epithelial plates, which are transformed to spherical bodies, lose thereby their fine granular quality, and finally, also, the nucleus, and at last become glass-clear, homogeneous, transparent vesicles. It is probable that already, in the first processes of the formation of the epithelial cells of the serous membranes, some have the office of protecting plates, others of secreting structures. Perhaps, also, the most important office of

the epithelium of the serous membranes, does not consist so much in forming a protective covering, as in serving the processes of secretion; and it is supposable that most of the cells are not transformed into an apparatus of secretion, but disappear metamorphosed in another manner.

The explanation of the author, according to which the constituents hitherto considered as epithelial structures have the importance of secretion cells, finds in other parts of the body a powerful support. It has been ascertained that the contents of the cylinder cells of the intestine is mucus, and that the mucous lining of the stomach, so to speak, consists merely of the contents of ruptured epithelial cells (Kölliker).

The cylinder cells of the stomach, according to Todd and Bowman, are filled with a transparent mucus, which flows out at their free end through a sort of dehiscence. Upon the foreskin of the clitoris, as well as upon that of the penis, the preputial unguent arises from the transformation of the epidermal plates into a yellowish, fine, granular mass, having a peculiar smell.

As after the formation of other formal constituents from the sanguine fluid, there still remains a fluid which moistens these constituents in most of the tissues, as a so-called animal water, so also there remains, as a remnant of the blastema of the epithelial cells of serous membranes, a fluid which, however, does not serve to moisten, but rather as a menstruum of the secretion cells. We must therefore define the serous fluid as "liquified secretion cells, animal water."

The *aqueous humor* is formed after the manner of the cerebro-spinal fluid and the fluids of the serous membranes, from the cells lining the anterior chambers of the eye.—*Schmidt's Jahrbücher, May,* 1854.

The formation and diffusion of Cancer Cells in the neighborhood of Cancer, and their importance in an operation. By J. L. C. Schröder van der Kolk.

As long ago as 1847, in the transactions of the Utrecht Society in relation to the origin, development, and diffusion of cancer, the author communicated the observation, that in the parts surrounding a cancerous tumor, at times somewhat widely diffused, in the tissues which appear to the naked eye still perfectly healthy, small cells arise, which increase in size and unite in groups as you approach the tumor. These investigations have been since prosecuted, especially upon labial or epithelial cancer, which is especially adapted thereto. In such a case, if we examine microscopically the bordering parts, apparently healthy, we find there in various quantity, according as the part is more remote from the cancer, small cells and nuclei, and finally a granular substance and fat granules between the

healthy tissue. Many times we see near one another the transition from nuclei, about which a cell-membrane is yet scarcely commenced, to perfectly developed epithelium cells. With a strong magnifying power we see also the transition of the granular substance and of the nuclei into cells, and how a soft, more or less granular substance is placed about the nuclei, so that a cell arises. Mostly, however, the nucleus lies already in the middle of the cell. The perfect cells, also, still show granular substance in the interior. The nuclei and cells diffuse themselves especially along the cellular tissue between the muscular fibres; but also upon the latter themselves occur nuclei and scattered cells. In other places, merely granular substance shows itself, and the first nucleal formation among the cellular tissue; between them are fat-granules, which are clearly distinguished, by their dark contours, from the little nuclei contained in the formation.

An alteration in the muscular fibres is perceived with difficulty. If they are even already covered with nuclei and small cells, yet, by proper examination, we still recognize the horizontal stripes. At many points, the latter seem really to disappear, and the muscular fibres have a more fibrous appearance. But, in particular cases, a dissolution or degeneration of the muscular fibres may be recognized, so that these fall into horizontally separated elements. Fat granules are then interspersed, as if the muscular fibres underwent the fatty transformation. When the muscular fibres are wholly covered with nuclei, so that they can be scarcely recognized in a partial manner, they appear to be thinner; at least, they are more or less supplanted by the cell and nucleus formation in the interjacent cellular tissue. In the nerves, a degeneration cannot with certainty be detected in labial cancer, Even if the nervous bundles are wholly surrounded with epithelium cells. yet in the neurolemma no trace of degeneration is exhibited. Only at particular points are, at times, nuclei and small cells perceptible between the nervous tubes, but far more sparingly than between the muscular fibres. In two instances, single nerve-tubes appeared to run off into the cellular tissue, covered with epithelium cells. In other cases of cancer, on the other hand, we find degeneration of the nerves appearing later. Also in the follicles of the beard, and in the sebaceous glands, an unusual number of epithelium cells and nuclei occurs, through which all parts become supplanted, and finally degenerate through fat-metamorphosis and fall into dissolution.

The cause is yet unknown of that active cell-formation through which, in the humors of the parenchyma of yet healthy parts, new cells appear continually to arise from small nuclei and fat-granules, which more and more present themselves as epithelium cells. A change of substance and a transformation, however, certainly take place between these cells and the interstitial fluidity, so that the fluidity existing between the cells of the

tumor contains thereby other constituents than the parenchymal fluidity of the bordering healthy parts. But both kinds of fluidity now flow together in the bordering parts, and commingle; and hence it is easily explicable, that in the surrounding tissues the same nuclei and cells arise as in the tumor itself. The diffusion of the parenchymal fluidity, along the course of the cellular tissue, among all parts, explains why the new nuclear and cell formation follows exactly the same course between the muscles and other parts. But these parts resist for a long time the pressure of the new formations, and with the naked eye we yet perceive no alterations in the m when the microscope already shows the cell formation.

The importance of these cell formations, in operative cases, is subject to no doubt. Thus Prof. Suermann wished a microscopic investigation of an extirpated lip, concerning the ulcerative or cancerous nature of which certainty was desired. The formation from epithelium cells left no doubt as to its cancerous nature. When fine lamellæ of the cut edges of the extirpated piece were brought under the microscope, granules, nuclei, and already developed epithelium cells were to be seen; from whence it was concluded, that beginnings of the progressive evil might also be contained in the unextirpated parts of the lip, although the section was carried from $1\frac{1}{2}$—2‴ distance from the real tumor. A return of the mischief was therefore to be feared. Notwithstanding the rapid and favorable healing of the wound, within three months new growths arose in the lip, which, after frightful destruction, finally produced a fatal termination.

The author has also of late, in several cases of extirpation of labial cancer, found nuclei and epithelium cells in the cut edges; the brevity, however, of the time passed since the operation, has thus far determined no judgment as to the result. A solution of these epithelium cells, through the inflammation following the operation, is hardly supposable, and, at times, the wound from the operation is accustomed to heal by the first intention. Of a solution through suppuration, there cannot be a question. It will depend upon the degree of development of the remaining cells, upon the degree of the subsequent irritation, upon the afflux of fluids and the change of substance thereby effected, whether these cells begin to develope themselves anew after the healing of the wound.

It is farther to be considered, that the degenerated parenchymal fluidity not only advances slowly in the surrounding parts, and induces ulceration, it is also taken up by the lymphatic vessels, and similar growths arise in remote parts. This occurs especially in true cancer, but it has also been observed in epithelial cancer. Donders related a case of labial cancer to the author, in which the glands of the throat and larynx were swollen and filled with epithelial cells. A diffusion of epithelial cells has also been observed by Lebert, Bennett, Hannover. It may seem doubtful, whether in

such cases of diffusion of epithelial cells, we should admit merely a chemical alteration of the infected and absorbed parenchymal fluidity, or a penetration of fine nuclei and cells into the lymphatic vessels. The altered parenchymal fluidity is, however, more probable, since we see that cancer cells may be found even in a structureless membrane enveloping the muscular fibres, the sarcolemma, through which nuclei do not penetrate. In a case of epithelial cancer of the tongue, the author found not merely epithelial cells deep at the root of the tongue between the muscular fibres, but also a cancerous tumor in the throat, which had passed into open cancer and contained common cancer cells without epithelial cells; which would show that in epithelioma, from absorption of parenchymal fluidity, many times general infection also, and secondary cancer cells of a different character, may be formed. Lebert and Hannover deny that epithelial cancer can pass into true cancer, and that one form induces another; therefore, when carcinoma follows upon epithelioma, Hannover admits only a combination of the two forms. According to Bennet, on the other hand, the epithelium-cells, at times the young ones, can take on the character of true cancer cells. It is also a question, whether parenchymal fluidity from an epithelioma may not be altered by the lymphatic vessels, and perhaps, also, by the blood-vessels, in such manner that it, elsewhere, for example in the glands, may give rise to true cancer cells, although, in other circumstances, epithelial cells might be formed. The origin of true cancer in epithelioma labii can scarcely be otherwise explained. Schrant is also of the opinion, that true cancer may arise from epithelioma.

In common cancer and in medullary sarcoma, the cells are diffused in like manner around the tumor, as in epithelioma, while the parenchymal fluidity also induces the cell formation. This was clearly shown in a medullary fungus upon the leg of a woman of eighty years, by which the gastrocnemius had been, for the most part, destroyed. Under the microscope, it was seen that the primitive muscular bundles had wholly lost their structure in the parts most affected; the form of the fibres could still be seen, but only a mass of nuclei were distinguishable, ranked more or less lengthwise, one after another, and inclosed in the unaltered sarcolemma. In other places, the primitive muscular bundles were yet remaining, and had also their horizontal stripes, but they were transparent, and beneath the sarcolemma covered with cells and permeated by fat droplets. Finally, at many points the primitive bundles had undergone the following important alteration: the fibres lay in their sarcolemma transformed into longer or shorter fibre cells, here thickly upon one another, here again in less number, and there appeared to be displayed a succession of rows of nuclei and cells, and fibre cells. Some cells also lay without upon the sarcolemma. Hence it follows, that the pathological parenchymal fluidity may also

exude through the sarcolemma, in which case the same cell-formation takes place within this sheath as, earlier, in the surrounding cellular tissue. The parenchymal fluidity must also suffer such an alteration under the influence of the cancer cells, that it becomes everywhere adapted to the production of like cells and nuclei. Through the formation of such cells within the sheath, the nutrition of the muscular fibre becomes disturbed; it separates into long, extended portions, which resemble the involuntary muscular fibres, and is at last wholly destroyed. The sarcolemma appears to resist a long time. Bennet has also, in part, observed and described these alterations of the muscular fibres.

The cancer cells also affect the nerves in an important manner. The condition of the fibular nerve, in the above-mentioned case, furnished among others a striking example. In the parts suffering most, no primitive fibres were longer to be distinguished, the nerve appeared, in consequence of atrophy of the nerve-tubes, to consist only of cellular tissue. Bennet has also observed the disappearance of the nerve-fibres.

The same diffusion of cancer cells, the author has also observed in the interior parts of the body. This formation of cancer cells can even be extended through the walls of the blood-vessels, and, at times, of the veins. In fungus medullaris of the liver, and also of the stomach, a portion of the cancerous mass was found in the cavity of the portal vein, where it might extend itself even to the smaller branches, without being surrounded by a membrane. The author here takes the opportunity to recall an opinion expressed by him long since, and confirmed by manifold recent investigations, namely, that in fibrous tumor and in carcinoma, we can fill with injections only fine capillary arteries, and that no veins appear to occur therein, which are in communication with the other veins. He possesses many preparations, in which the healthy parts about the cancer, are colored deep blue by the numerous veins, while the tumor itself is colored wholly red, only by arterial capillaries. The blood in cancer appears to return to the arteries, so that also a new capillary net-work arises between the veins, similar to the portal system between the arterial system. Upon further extension of the tumor, veins may become included and apparently pass through the cancer; but these are clearly older, larger veins. In the meantime, the finer veins appear to be destroyed or obliterated; for, in cancer of the stomach, we no longer find any capillary veins in the parts where they must have been formerly contained.

From what has been hitherto said, it is clear that when once an epithelioma, or any other cancer, is formed and attains a certain maturity or development, the diffusion of the evil takes place, in so far as new cells are constantly formed from nuclei in the parenchymal fluidity of the contiguous parts. Many times the nuclei are multiplied in a cell already formed;

these nuclei then become cells, and there arises a maternal cell, which at length bursts, so that the inclosed cells can issue free. This latter, however, appears only to happen in carcinoma or medullary cancer, not in epithelioma. The parenchymal fluidity must also acquire the property of forming homogenous cancer cells through an interchange of constituents, which must necessarily take place between the already-formed cancer cells and this fluidity; the diffusion of this fluidity in the surrounding parts, is the cause of the local diffusion of cancer. The surrounding parts not seldom succumb to the cancer; but between, and in them, are developed cancer cells, whereby the other tissues become broken up and disappear.

It has been supposed, that the destruction or the disappearance of the surrounding parts was chiefly the result of the pressure suffered by these parts from the increasing cancerous tumor. But this is not so. The altered parenchymal fluidity calls forth at first in the cellular tissue, afterwards also in the textural parts themselves, the process of cell-formation, in the muscular fibres, in the nerve-tubes, etc. At the same time an abundant formation of fat takes place, through which the healthy constituents appear to become more and more broken up. They are, therefore, much less destroyed by pressure than by defective nutrition. But the pathological parenchymal fluidity is diffused not merely in the immediate neighborhood of the cancerous tumor, it is also conducted by the lymphatic vessels to the nearest glands, as the above-mentioned cases show. In medullary sarcoma of the liver, or of the stomach, the author also several times saw the lymphatic vessels as thick white cords running along the sternum, and they could be traced to the likewise swollen thoracic duct. The contents of these distended lymphatic vessels corresponded perfectly with the cells of the medullary sarcoma; the pathological parenchymal fluidity was also carried by them into the blood and throughout the body. But this absorption probably did not take place merely through the lymphatic vessels, but also through capillaries and veins which were washed by the parenchymal fluidity. If this absorption has been in sufficient quantity, then follows a secondary formation of cancer cells, and an outbreak of cancer in other parts.

Remarkable was a case of cancer of the tongue, which had destroyed the whole left half of the organ. The patient died suddenly from a profuse hæmorrhage, the result of laceration of the ranine artery while eating. This artery, in most of its course, was changed into a dark band, and the lingual nerve, also, where it entered the cancer, was much thickened, and further along a black slimy strip, which had been seen during the lifetime of the patient, lying in the mouth. On the right side, the nerves were yet apparently healthy; but in the lingualis, and still more in the hypoglossus, were found little inequalities, as if tubercles had been developed in the

interior. In the last-named nerve, also, upon section, cancer cells actually showed themselves, and partial atrophy of the nerve-tubes. A direct penetration of the parenchymal fluidity into this diseased hypoglossus, is quite improbable; a secondary cell-formation took place here, through general infection of the fluids. Inflammation or suppuration of the surrounding parts does not easily affect the nerves; cancer, on the other hand, appears easily to produce disturbances in them. In a case, for example, which the author examined, the whole ischiatic nerve was destroyed at its exit from the os sacrum, and no longer in connection with the inferior parts. The burning, lancinating pains, in the course of the cancer, appear, also, to depend upon the formation of cancer cells in the neighboring nerves; they seem then to show that the cancer is no longer local, but has already begun to spread to contiguous parts; from which the operator's hope of a favorable issue must be much diminished. Unfortunately, the operation is frequently undertaken too late, as well from the fault of the patient, who keeps the disease too long secret, as through the fault of the surgeon, who will only resort to this remedy when there can no longer be any doubt as to the existence of a cancer. The frequent fatal relapses after delayed operations, should be an inducement to remove every node or induration from which cancer may be afterwards developed. The operation then belongs to the unimportant, and no disadvantage arises, even if the tumor prove to be of the benignant kind.

This becomes still clearer when we follow the formation of scirrhus and of cancer. If we examine a scirrhus in the stage of the hard node, we find nuclei and very small cells, which become enveloped by fibres. The scirrhus grows but slowly; no great interchange of substance yet takes place in it. Through the slow increase of the cells, and the enlargement of their groups, the surrounding cellular tissue becomes stretched, and the hardness of the tumor increases. Beyond the fibres enveloping the scirrhus, no nuclei and cells yet occur in the neighboring tissue, and we may yet consider the evil as a local one. In genuine cancer, on the other hand, a more rapid cell-formation follows, the cells are larger, and are not separated from the neighboring tissues by such thick layers of cellular tissue and fibres; the whole tumor loses in hardness, because there is more parenchymal fluidity, and thence arises a more active interchange of substance with the existing cells, which are therefore also more readily reproduced. If the tumor is luxuriant, it then feels soft, it is designated as medullary sarcoma, and consists almost entirely of cells, many times without a trace of fibres.

From this development of cancer we can only expect, in the first period, since from the slight interchange of substance the cell-contents has not yet diffused itself in the mass of the scanty parenchymal fluidity, that the con-

tiguous parts would not be penetrated thereby. The increase of the node shows greater activity in the tumor, a more lively interchange of constituents, and a diffusion of the infected parenchymal fluidity. If burning, shooting pains occur, we may then consider it as certain that the parenchymal fluidity has already penetrated the nearest nerves, inducing new cell-formation, together with destruction of the nerve-tubes. In the cancer itself no nerves occur, and it possesses no feeling.

In extirpation of a cancer, not merely much of the apparently sound parts must be removed; but, after the operation, the cut edges should always be accurately examined with the microscope, since if at one or more points, granular substance, nuclei, or cells are found, the diseased part has not been completely removed. In such a case, we must resort to more extensive extirpation, or at least to the application of caustic, in order to prevent a relapse. Bennett has also directed attention to the necessity of microscopic examination immediately after the operation, and maintains that every suspicious tissue should be examined before we close the wound.

The author takes this opportunity to recommend a strong solution of iodide of potassium applied upon an already open and fungous cancer. By covering a fungus with compresses wet in such a solution, it not seldom disappears and becomes resolved, and the disagreeable smell and bleeding cease, while the remedy produces no injurious effects upon the surrounding parts. In a case of cancer of the tongue, with such an intumescence that the taking of food was difficult, the patient took continually such a solution in the mouth; the fungus became softer, and, after a couple of days, fell off, so that the tongue again resumed its normal size. Relapses are, of course, not obviated by it. This patient died subsequently from cancer of the throat, but his life was at least lengthened by this means. If we apply the salt in form of powder, the fungus disappears still quicker, and sphacelates without disadvantage to the other parts.

From the preceding, the author derives the following conclusions:—

1. Through an interchange of substance between cancer cells and intercellular fluidity, the latter acquires the property of generating new homogeneous nuclei and cells.

2. This intercellular fluidity stands in connection with that in the surrounding healthy parts. The latter obtains thereby the same constituents, and the disposition to form similar cells, which now arise along the course of the cellular substance in the surrounding healthy tissues.

3. From their minuteness and small quantity, the nuclei and cells are not perceptible with the naked eye; and thus the surrounding parts may appear perfectly healthy, although they bear in them the germ of a progressing cancer.

4. It is therefore important that in extirpation, the cut edges of the healthy parts should be accurately examined for cancer cells, with the microscope.

5. The burning, shooting pains in cancer may be considered as a proof that the cancer cells are diffused to a considerable extent, and to the nerves; they show that we have no longer to do with a merely local evil, and that no very certain result can be expected from the operation.

6. By absorption of the infected parenchymal fluidity, by means of the lymphatic vessels and veins, the whole body appears to become more or less infected, so that secondary cancer arises in remote places and parts, and an operation is no longer to be thought of.

7. The altered parenchymal fluidity penetrates into the organic tissues. The sarcolemma of the muscular fibres, and the walls of the nerve-tubes appear to take it up, and there arise, in the interior of both, similar nuclei and cells. Hence comes the absorption of the muscular fibre and of the nerve-contents, and the deposition of fat; the former become consumed and annihilated, while their envelopes, the sarcolemma, and the wall of the nerve-tubes, still remain.—*Schmidt's Jahrbücher, May*, 1854.

PART IV.—HOSPITAL RECORDS.

(*Crowded out by press of matter.*)

PART V.—EDITORIAL AND MISCELLANEOUS.

THE STUDY OF MEDICINE IN NEW YORK. For some reason, it is not worth while here to ask what, the advantages offered by this city to students of medicine have been singularly overlooked. The general purposes for which a city is sought by students desiring to complete a professional course are first, good teachers provided with abundant means of instruction, and second, abundant opportunities of seeing the many forms of disease. Of the instructors of this city, it perhaps does not become us to speak, and yet we must, in justice, say they do not fear comparison with those of any of our cities. With the means of instruction they are well furnished, and are diligent and laborious in using them.

Of the hospitals, however, we may speak with less reserve. No city can, during the winter season at least, at all compare with this in the number of patients suffering under all forms of disease, which are accessible to the student. About *three thousand* occupied beds are thus at his command; and though it is clearly impossible for him to see them all at once, still

they are fortunately so classified in different institutions that one disease, or one class of diseases, can be readily studied. Thus, Paris itself hardly presents greater facilities for the study of syphilis than does the Penitentiary Hospital. All common surgery may be constantly seen, while the more sure and striking operations are continually required. Two eye infirmaries, four very large dispensaries, and clinics connected with all the schools, present opportunities of studying general or particular disease which, we say without fear of contradiction, will astonish all who become familiar with them, and, with a single exception, all these are free to students. With all these advantages, however, the power has not been acquired of driving knowledge into those who will not study; but to those who are ready to work, we say here is all the material for gaining knowledge; bring to it your own industry, and your stores will increase rapidly, while you will continue to rejoice in your enlarged knowledge and experience.

MEDICAL EDUCATION.—No topic has been more prolific in essays, discussions, and opinions among medical men, for the last eight or ten years, than this. Almost every one has some "peculiar views" as to the best mode to be pursued in furnishing the minds of neophytes with the requisite amount of knowledge to authorize them to undertake the care of the sick. By no means is it our intention to add to the number of modes which will, undoubtedly, accomplish all these things, but rather to discuss certain points connected with the whole subject, and of importance in every view.

There are, evidently, two classes of instructors for students of medicine. One is composed of those who give office instruction, as it is termed: that is, who receive the pupil to their offices, who set before him his text-books, who show him more or less examples of disease, and give the general direction to his whole course. The other class is the body of public lecturers in the several branches of medical science, grouped as they are in the various medical colleges of our country. It is the first class who have, in fact, the privilege of admitting applicants to the study of medicine. It is the second class who have directly, or indirectly, authority to graduate them as fitted to practise the healing art. A certificate of study with the office preceptor is necessary to obtain admission as a candidate for graduation, and, therefore, the pupil *must* have passed under the tuition of both.

At the first glance, then, each class of instructors has his peculiar duties and responsibilities. It rests with the office instructor to guard the very entrance to the sacred penetralia, and to turn back the ignorant or unworthy applicant, while it is the public lecturers who must, by their united decision, say whether or not those who have been sent to them are worthy of the honors to which they aspire. To each, then, should the profession

look for that defence against the admission of base men to their ranks, which has been intrusted to them. In fact, however, it has been usually the public, not the private, teachers who have been blamed for whatever of error has been committed in this respect. It is they, it is alleged, who have conferred the degrees, they only are blameable. It is not our purpose to deny that fault may rest with them; we admit that it does so rest with more or less of them. But we, at the same time, say that more blame is justly chargeable to private instructors. It is they who admit unqualified persons to their offices; it is they who best know their deficiencies; it is they who are best acquainted with their moral character; and still, it is they who send them to the colleges with certificates of time passed in the study of medicine, and, at the worst, make no objection on the score of bad morals. The professors of any college must be unable to detect any moral deficiency, when at the longest they see pupils but for six months, and then not with the intimacy of a private instructor,—unless, indeed, the immorality be excessive. And so, too, with those who are ignorant. Cramming, impudence, and accident do very much towards blinding those most desirous of ascertaining the actual degree of knowledge possessed by an individual. Still, every year, more or less applicants for graduation are rejected from both these causes; and yet the private preceptor has sent them to the colleges with the necessary certificates. Good-nature, or the fear of displeasing the individual or his friends, may, in many instances, account for this, but the fact remains the same.

It must be allowed to be a singular circumstance that, in our country, the schools are the scape-goats for whatever of error has been committed in lowering the degree of education of medical men. Our national Association has appointed committees on committees to attend to, and report upon, this very thing. Sometimes views have been taken similar to those just stated; but more generally it has been the schools—the schools, that have been advised to be tinkered, or altered, or amended. This arises, we do not doubt, from the fact that poor human nature is fond of laying its own burdens upon others' shoulders, and in confessing faults to exist in others rather than in itself. Long lecture-terms are advised, and urged, and insisted upon as the great cure-all; and more departments, and more professors, are spoken of as equally certain remedies. Still the faults of the private instructor are overlooked; or cannot be reached, and the evil continues to exist, simply because its source remains.

We do not say this because we are not willing and desirous to aid any scheme which shall seem to promise a real improvement in this matter; but we are not anxious to run after every *ignis fatuus* that dances in the distance; and prefer to keep to the well-trodden path, rather than risk ourself in the boggy woods of theoretical and utopian plans.

The immediate cause of these remarks must be found in a memorial from the American Medical Society of Paris, presented to the National Association, at its last meeting, of which we had before purposed to speak, and which has been recalled to our remembrance. This Society states that the Association had its origin "from the consciousness of physicians of the low state of medical education in our country," and the desire to improve it; that they, "by our sojourn abroad, have become more painfully conscious of our infirmities and deficiencies at home;" and that they, therefore, recommend a plan for remedying all these defects. Now, when we remember who compose this Society, we confess to a suspicion that sending this memorial to the Association is a piece of impertinence. Americans who are studying medicine in Paris are the members of this Society; and these must be chiefly those who have but lately graduated. We say *must* be, because but few men of established practice can allow themselves more than a few months in Paris. It is not going too far to add, that they can hardly have exhausted all knowledge as to the requirements or wants of the profession at home, or the difficulties under which it labors; they have not tried the effect of changes, and cannot see the great difficulties which lie in the way of their accomplishment. A person entirely without experience of the effect of "a sojourn abroad" upon himself, can readily suppose that it would enable one to perceive his own deficiencies, whether they were owing to the defects of the system of education, or to his own insufficient diligence. It is not so clear how it should enable one to know the best remedy for the defects in that system. And this memorial would confirm this opinion. The Society urge this plan: that a board of examiners should be appointed by each State Medical Society every year, which shall publicly examine all applicants who are introduced by a member of the Society; and that no one shall, without such examination, be admitted to the State Society or National Association. To this plan we have only two objections; one, that it is not practicable; and the other, that if it were, it would do no good. The Society does not enter into particulars as to the qualifications to be demanded of candidates, but says, "They should not, however, believe in any peculiar doctrines or methods—no certificates of attendance upon courses of lectures should be necessary, but solely the possession of the necessary amount of medical knowledge to practice their profession with safety and honor." That is to say, if we understand this language, no inquiry should be made as to whether or not they have been deluded by the "peculiar doctrines or methods" of Hahnemann, Priessnitz, or Thompson; none as to whether or not they have taken all available means of acquainting themselves with those portions of medical knowledge to be learned only from extensive museums, well-furnished cabinets, and expensive plates, which can be in the possession of colleges only; but the whole inquiry is, whether or not they

can answer for a little while (for the examination in such a case must be brief) to the questions proposed by the board in such a way as to satisfy that body. Thus, we should have the two safeguards, now placed one in the hands of the private preceptor, and the other in those of the schools, removed, and no substitute provided; while no Hippocratic oath would with its solemn promises challenge the attention, and warn the thoughtless errorist to turn away to a more congenial companionship.

The memorial says very truly, that this could have no effect on the established schools, and on this account we have spoken of it with perfect freedom. Only by injuring the profession could it in any way affect them.

We have said that sending this memorial to the Association seems to us impertinent. We ought to add, that we have no idea that it was *intended* to be so, but arises rather from inconsiderate haste. Persons have been known to write letters from Europe, giving glowing accounts of Italian skies, and Alpine scenery, and beautiful cataracts, who have never taken the trouble to see Niagara or St. Anthony, or to visit Mount Washington, or to think of the beautiful blue which, in their own country, is almost continually above them, and which Italians themselves confess to be unsurpassed. So, too, persons have been known to go to London and Paris to study medicine, who have not begun to exhaust the means of instruction offered to them at home, and have esteemed every thing which surpasses their own ignorance to surpass their own country. It is by no means impossible that there may be some such in this Society. Let it be understood that we do not undervalue a European education, or the advantages possessed by those who are permitted to follow the instructions of the learned men of the English, French, and German capitals. But these advantages do not confer all wisdom. Should a few students from Philadelphia, who had rarely gone to the Pennsylvania Hospital in that city, come to New York, and, pursuing their studies here with more diligence, have become acquainted with the advantages offered by Ward's Island, Blackwell's Island, Bellevue, and the New York hospitals, as well as elsewhere, form themselves into a society and send a memorial to the Medical Society of Philadelphia, composed in part, at least, of the instructors of that city—telling them that medical education in that city was in a terribly low state, and that they would advise the adoption of a certain course to improve it—would not such a proceeding be regarded as somewhat impertinent? In much this light do we look upon this memorial.

In our opinion, Dr. Sayre, of this city, did good service by calling attention to this document, which was at first carelessly received and referred, and by causing it to be laid on the table. This was due not to the interests of the schools, but to the dignity of all who sit in that Association as representatives of the American medical profession.

THE TRANSACTIONS.—The volume of Transactions of the Medical Association, we are rejoiced to learn, is making rapid progress, notwithstanding the many detentions necessary when so many authors desire to see their proofs. The mechanical execution will do credit to the printers, Messrs. Baker, Godwin, & Co., as does every thing that comes from their hands. It is decided that the volume shall be bound; and we can thus promise the profession a pleasanter book, so far as externals are concerned, than any of its predecessors. Members should send in their subscriptions at once, if they wish to secure copies.

CHOLERA.—With the remarkably cool weather of August, this disease has rapidly abated in our city. On the first of September, one of the cholera hospitals, that in Franklin street, will be closed. The Mott street hospital will continue open longer. The returns show a very good percentage of recoveries in these institutions, when the condition in which patients are received is remembered, some being, in fact, moribund. The disease has at no time this summer prevailed to any alarming extent, except among the poorer classes, and those who were imprudent in diet and exposure.

AT a special meeting of the Medical Board of the State Emigrant Refuge Hospital, held in June—present, Drs. Cox, Carnochan, Emmett, Ford, Habel, and Schilling, the following resolutions in reference to the late Dr. Macneven, were unanimously adopted :—

Whereas, This Board has learned with sincere sorrow, that since the last meeting, their colleague, William H. Macneven, M. D., one of the physicians of this Hospital has been removed from among them by death, in the prime of life, in the midst of eminent usefulness,

Therefore, *Resolved*, That this Board has sustained a severe loss in the demise of Dr. Macneven, who by his professional acquirements was an able and valuable counsellor, and by his uniformly kind and gentlemanly bearing had won the respect and esteem of all his colleagues.

Resolved, That this Board sympathizes most deeply with his afflicted mother and family in their melancholy bereavement.

Resolved, That the President and Secretary of this Board sign and send a copy of these resolutions to his family.

Signed,

HENRY G. COX, M. D., *President.*

T. ADDIS EMMETT, M. D., *Secretary.*